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Environmental Assessment
NV60-EA93-038

Normal Fire Rehabilitation Plan

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FINDING OF NO SIGNIFICANT IMPACT/DECISION RECORD
Normal Fire Rehabilitation Plan
N60-EA3-38

DECISION

The decision is to implement the Proposed Action of the Normal Fire Rehabilitation Plan (NFRP) and Environmental Assessment for the Battle Mountain District. The Proposed Action is in conformance with each of the District's three land use plans: Shoshone-Eureka Resource Management Plan (RMP)(approved 1986), the Tonopah Management Framework Plan (MFP)(approved 1981), and the Esmeralda-Southern Nye RMP(approved 1986). The proposed action as analyzed in the NFRP is listed below and will be implemented either separately or in combination to meet the fire rehabilitation needs of the Battle Mountain District:

1. Natural Revegetation With Closure
2. Planting of Multiple Species Seed Mixtures
3. Planting of Native Shrub or Tree Species
4. Construction of Erosion and Sediment Control Structures
5. Greenstripping

The following stipulations will apply:

1. Proposed Action

Natural Revegetation With Closure

a. Monitoring studies will be established to determine when grazing shall be resumed.

Planting of Multiple Species Seed Mixtures

a. Seed will be applied only in designated areas at rate and mixtures specified. Aerial broadcast of seed will only be considered in areas receiving greater than 10 inches precipitation.

b. Islands of unburned vegetation will not be seeded.

c. A cultural inventory will be completed prior to ground disturbing activities. If archaeological values are present, the areas will be flagged and will not be disturbed. (However, the use of hand seeders and aerial seed application will be allowed on these areas).

d. Burn areas receiving less than eight inches of annual precipitation generally will not be considered for seedings.

e. The USDA-Nevada Bulletin "Soils Guide for Rating According To Their Relative Suitability for Rangeland Seedings in Nevada" and BLM Technical Note "Interim Guide For Rating Soils According To Their Soil Suitability For Rangeland Seeding - Nevada" will be used to determine whether a burn area is suitable for a rangeland seeding.

f. A project inspector will monitor all phases of the proposed project.

g. The area to be seeded will be deferred from grazing for at least two growing seasons or until vegetation is successfully established, either by fencing or closing of

pastures or entire allotments. In lieu of a signed agreement, a grazing decision will be issued with notification of the closures.

h. Drill rows will run along the contour of the land; except where not practical in established greenstrips. Sanfoin, upland alfalfa, and yellow sweet clover will be drilled if a "nurse crop" is needed to provide for soil stability.

i. Browse species with the exception of four-wing saltbush, Prostrate kochia, and sagebrush will generally only be seeded in areas receiving greater than 12 inches annual precipitation.

j. Seeds of species requiring scarification will be properly treated to ensure timely germination.

k. Monitoring studies will be established to determine the effectiveness of every seeding and to indicate when grazing shall be resumed.

l. Crested wheatgrass may not be seeded within riparian areas or on historic floodplains adjacent to riparian areas.

m. Sagebrush and forb species will be included as part of the rehabilitation plan in sage grouse use areas as per the sage grouse Management Guidelines set forth by the Western States Sage Grouse Committee. In general these guidelines stress the importance of sagebrush to sage grouse populations.

n. Necessary precautions will be taken to avoid active raptor nests and to avoid disruptions to nesting and rearing activities.

o. If WSA's are seeded, the seed mix will consist of those species already found in the area.

Planting of Native Shrub or Tree Seedlings

a. Monitoring studies will be established for all seedling projects.

Construction of Erosion and Sediment Control Structures

a. Planning, design, and construction of erosion and sediment control structures and floodwater retarding structures will be done in accordance with BLM Manual 1741.2, water control structures, and the State of Nevada, Handbook of Best Management Practices.

Greenstripping

a. Guidance on preparation and implementation of greenstripping plans will follow Instruction Memorandum No. NV-92-252.

Fencing

a. All steel fence posts will be green.

b. A cultural inventory will be completed along proposed new fences prior to any construction activity. Mitigation will take place if cultural values are present.

c. In most cases fencing construction and reconstruction will conform to the BLM Manual Handbook H-1741-1 and district policy as identified in Instruction Memorandum NV-86-04. Exceptions to this policy will be approved by the District Manager.

d. All necessary easements will be acquired by ATROW specialist prior to construction.

e. Fences in wildhorse areas will designed in such a way as to be visible to horses and will have at least one gate installed per mile and/or every corner.

Rationale

Wildfire is a frequent occurrence on the Battle Mountain District, burning an average of 9,978 acres each year. Often fire-caused resource damages and the potential for further resource degradation warrant the action of rehabilitation measures. Fire rehabilitation actions must be directed by the following: (1). viability of remaining vegetation after the wildfire (2). compatibility of the site for a successful rehabilitation effort and (3). benefit of the rehabilitation versus cost of the rehabilitation effort. The proposed action will allow the district to adequately respond to a broad range of rehabilitation situations, in time frames that are consistent with the emergency nature of fire rehabilitation.

FONSI

The proposed action described in the Battle Mountain District Normal Fire Rehabilitation Plan and Environmental Assessment (N60-EA3-38) does constitute a major Federal action. There will be no significant impact to the environment as a result of the proposed action. Therefore, the preparation of an environmental impact statement is not required.

Recommended by:

NV064 — 3/21/94

Wayne King, Manager
Shoshone/Eureka Resource Area — Date

Theodore J. Angle — 3/18/94

Ted Angle, Manager
Tonopah Resource Area — Date

Approved by:

James D. Currivan — 3/21/94

James D. Currivan
District Manager — Date

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BATTLE MOUNTAIN DISTRICT
NORMAL FIRE REHABILITATION PLAN
EA-N60-EA3-38

I. INTRODUCTION

A. Objective and Purpose

The objective is to streamline the Emergency Fire Rehabilitation (EFR) procedures. The proposed action outlined in this Environmental Assessment (EA) will allow the District to complete on the ground treatments within time frames that are consistent with the urgent nature of fire rehabilitation. This EA, along with advance procurement and administrative procedures, will allow the District to proceed with EFR projects quickly.

The purpose of EFR is to initiate a combination of planned actions in the shortest time frame possible to reduce the adverse effects of wildfire by minimizing:

1. Loss of additional watershed cover (vegetation);
2. Loss of soil and on-site productivity;
3. Loss of water control and deterioration of water quality;
4. Damage to property on and off site;
5. Invasion of burned area by highly flammable, unpalatable plants.
6. Detrimental alteration of critical fish and wildlife habitat.

The EFR environmental analysis will be a tiered process with the Normal Fire Rehabilitation Plan (NFRP) being a programmatic document. A Decision Record will be written for each EFR project along with an addendum to this EA. The addendum will include a discussion of the fire, the resources damaged and at risk as a result of the fire, the proposed rehabilitation practices to be implemented, site specific impacts not discussed in this EA, a discussion of any cumulative impacts, and the project stipulations that apply. The content of the addendum is outlined in appendix 1.

This approved plan and EA, along with advanced procurement and administrative procedures will allow the District to proceed with EFR projects that fall into the dollar amount the District Manager is delegated to approve. When the cost of the project exceeds the District Manager's delegation or when EFR funds have been rescinded, this EA will be used as a programmatic document in the preparation of an EFR Plan. All rehabilitation projects will be done on BALM managed lands.

B. Area Covered by Normal Fire Rehabilitation Plan

This plan covers the entire Battle Mountain District located in Central Nevada. The District consists of 10.6 million acres within two resource areas; the Shoshone/Eureka and Tonopah. Most of the fire rehabilitation efforts take place in the Shoshone-Eureka Resource Area within the northern half of the District. The

Tonopah Resource Area is in the southern part of the District and has a very low wildfire occurrence due to dryness and scarce fuels. Where fires due occur in the Tonopah Resource Area there is a limited chance for successful rehabilitation within the salt desert shrub ecosystem. Therefore, this plan will predominately address the northern portion of the District because this is where the potential for successful wildland fire rehabilitation is most likely to occur. Map 1 shows the District and resource area boundaries.

The District is currently updating its Fire Management Activity Plan. Included in the plan are fire suppression zones based on fire suppression priorities. A description of these zones are listed below and a map delineating these zones is available in the District Office.

FIRE PROTECTION ZONES:

Zone 1 -Individual fires held to less than 2000 acres utilizing the least cost of suppression.

Zone 2 -Individual fires held to less than 1000 acres utilizing the least cost of suppression.

Zone 3 -Individual fires held to less than 300 acres utilizing the least cost of suppression.

Zone 4 -Individual fires held to less than 100 acres utilizing the least cost of suppression.

Zone 5 -All fires held to minimum acreage.

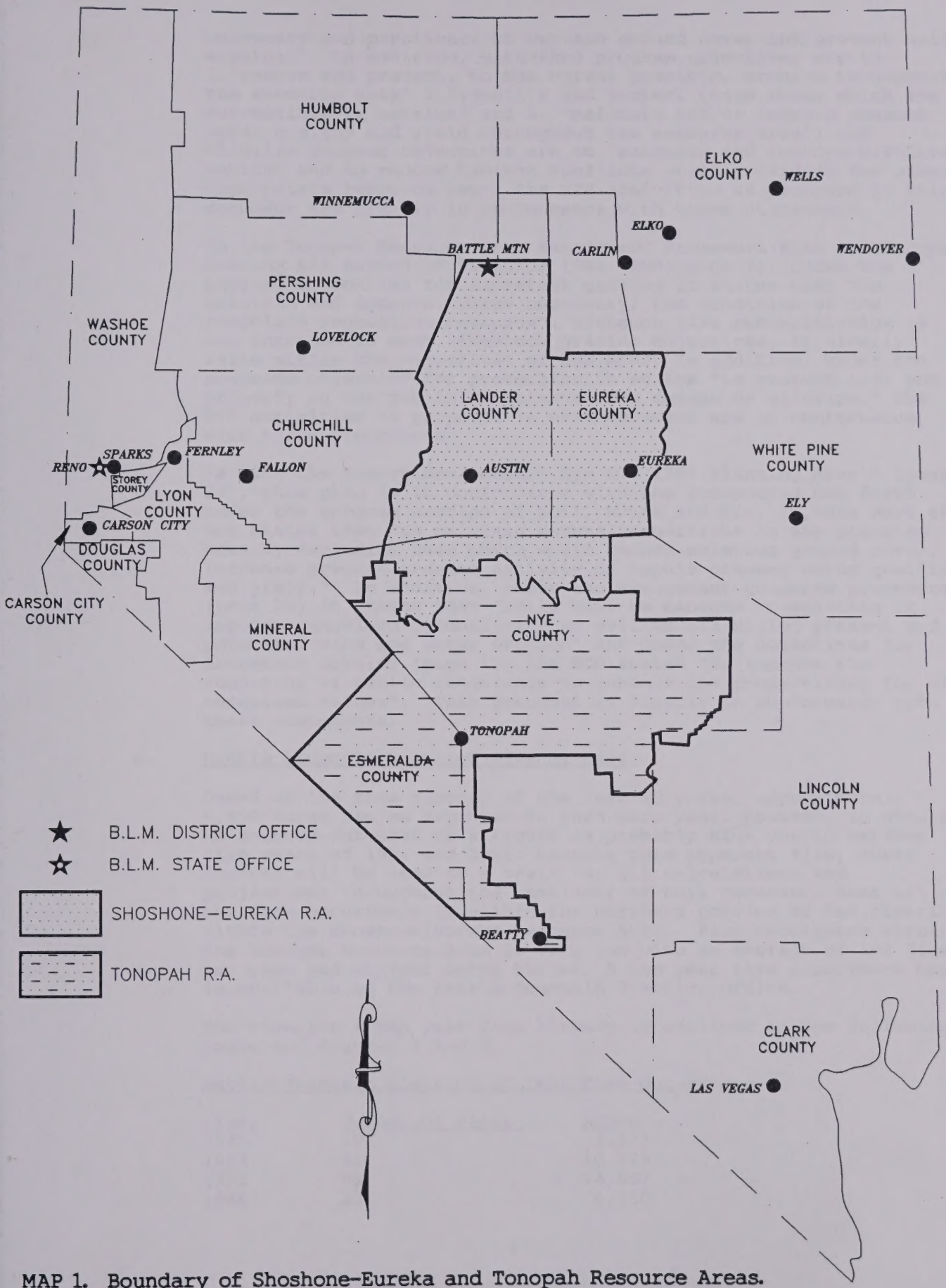
It should be understood that "limited suppression" is not an appropriate suppression response under the guidelines of the Fire Management Activity Plan. All wildland fires will receive appropriate response and initial attack. The zones outlined above are used as a part of the escape fire situation analysis (EFSA) to determine resource objectives that will govern and prioritize the appropriate suppression response if multiple fires are occurring within the District.

This suppression zone concept could be used in assigning priority to areas for EFR projects. However, an area will not be denied rehabilitation based solely on the suppression zone in which the fire occurred.

C. Land Use Planning Objectives

Emergency Fire Rehabilitation was not identified as an issue in the development of either the Shoshone/Eureka Resource Management Plan (RMP)(approved 1986), the Tonopah Management Framework Plan (MFP)(approved 1981), or the Esmeralda-Southern Nye RMP (approved 1986). Although Emergency Fire Rehabilitation was not specifically provided for in either of these three land use plans, EFR is clearly consistent with the terms and conditions of the three land use plans. The discussion that follows illustrates that this document and subsequent EFR proposals are in conformance with each of the District's three land use plans.

In the Shoshone/Eureka RMP Amendment 1987, under the programs "Standard Operating Procedures" (page 12) it states that "all disturbed areas will be rehabilitated, where such action is



MAP 1. Boundary of Shoshone-Eureka and Tonopah Resource Areas.

necessary and practical, to replace ground cover and prevent soil erosion." In addition, watershed program objectives are to: 1."reduce and prevent, to the extent possible, erosion throughout the resource area" 2."Identify and protect those areas which are susceptible to erosion" and 3. "maintain and/or improve present water quality and yield throughout the resource area"; and Wildlife program objectives are to "maintain and improve wildlife habitat and to reduce habitat conflicts while providing for other appropriate resource use". The EFR activities as proposed in this document are clearly in conformance with these statements.

In the Tonopah Resource Area Management Framework Plan and Tonopah Grazing EIS Record of Decision 1981 (ROD)(page 2), under the program objectives for livestock grazing it states that "to maintain and improve, where necessary, the condition of the rangeland vegetation resource". Although fire rehabilitation is not intended to meet livestock grazing objectives, it clearly falls within the objectives of the NFRP. In addition, under the programs objective for protection it states "to protect life and property on the public rangelands from damage by wildfire." The EFR activities as proposed in this document are in conformance with these statements.

As with the Esmeralda-Southern Nye ROD 1986 Planning Area A (page 23), this plan is in conformance with the procedures set forth under the program section of Soil, Water and Air. In this part the ROD states that "to maintain natural conditions in the planning area by excluding uses which would reduce existing ground cover, increase present erosion activity or impair present water quality and yield." In addition, under the management guidance procedures (page 23) it states that "soils will be managed to maintain or improve rangeland productivity as well as minimizing present and potential wind and water erosion" and under the objectives for livestock grazing (page 12) the ROD states "to improve the condition of public rangelands to enhance the productivity for all rangeland values". This document is clearly in conformance with these statements.

D. Battle Mountain District Fire History

Based on the fire history of the last 10 years, approximately 9,978 acres can be expected to burn each year. However, it should be pointed out that this figure is probably high due to extreme fire years of 1984 and 1985. Despite this apparent flaw, these figures will be used as a basis for all calculations and projections throughout the remainder of this document. Most all of the fire occurrence is within the northern portion of the District within the Shoshone/Eureka Resource Area. Fire occurrence within the Tonopah Resource Area is very low with an average of 1-2 fires per year and minimal acres burned. A ten year fire occurrence map is available at the Battle Mountain District Office.

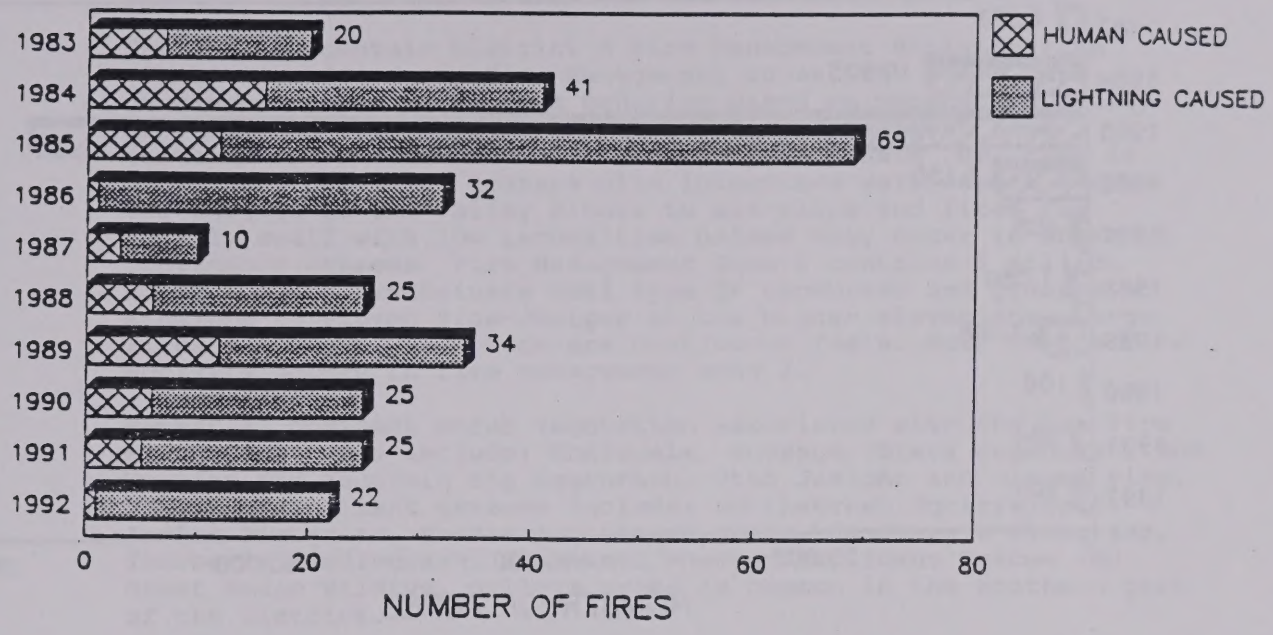
The District's ten year fire history is outlined in the following table and figures 1 and 2.

Battle Mountain District 10 Year Fire Occurrence

Year	Number Of Fires	Acres
1983	20	1,273
1984	41	10,925
1985	69	74,887
1986	32	6,150

BATTLE MOUNTAIN DISTRICT 1983-1992

FIRE OCCURRENCE



STATISTICS ARE FOR TYPE 1&2 FIRES

FIRE OCCURRENCE TREND

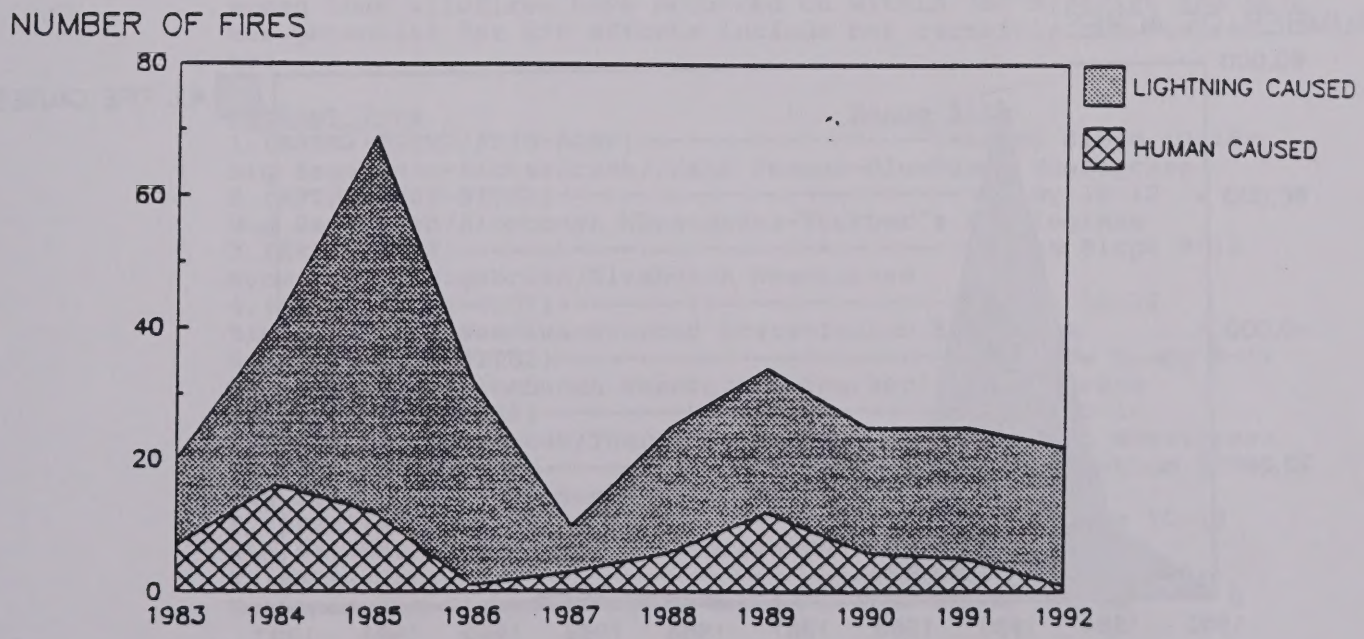
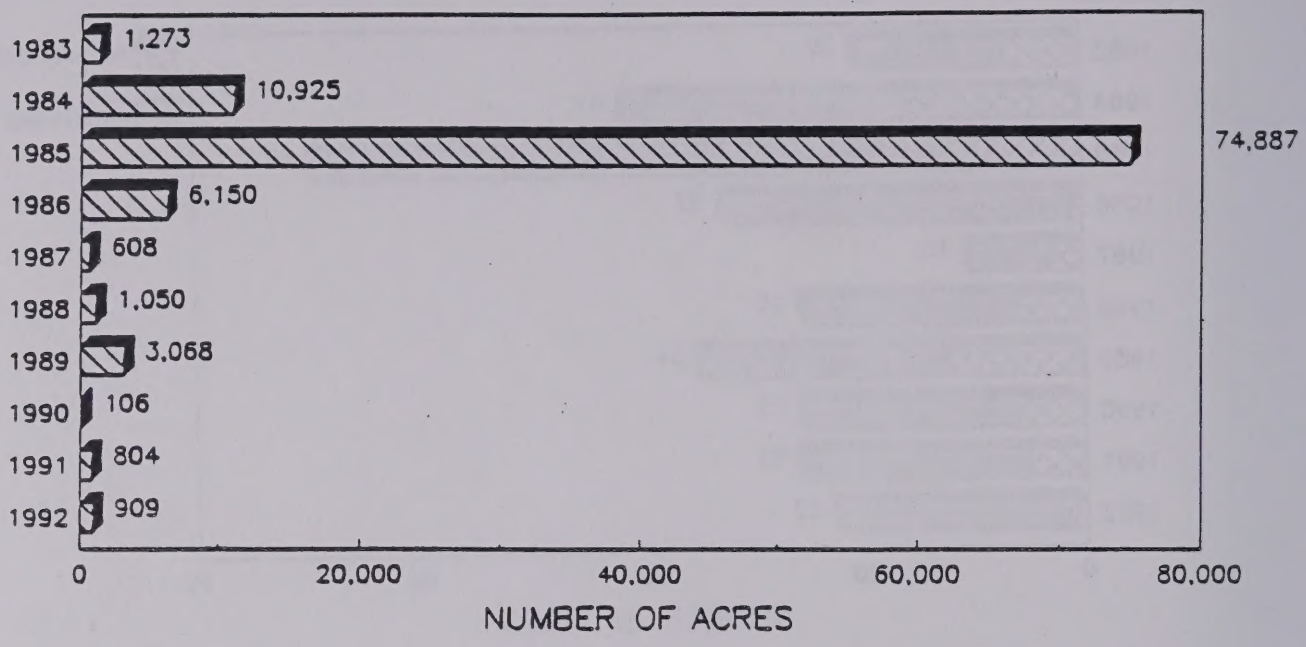


FIGURE 1.

BATTLE MOUNTAIN DISTRICT 1983-1992

FIRE OCCURRENCE
ACRES BURNED



STATISTICS ARE FOR TYPE 1&2 FIRES

ACRES BURNED TREND

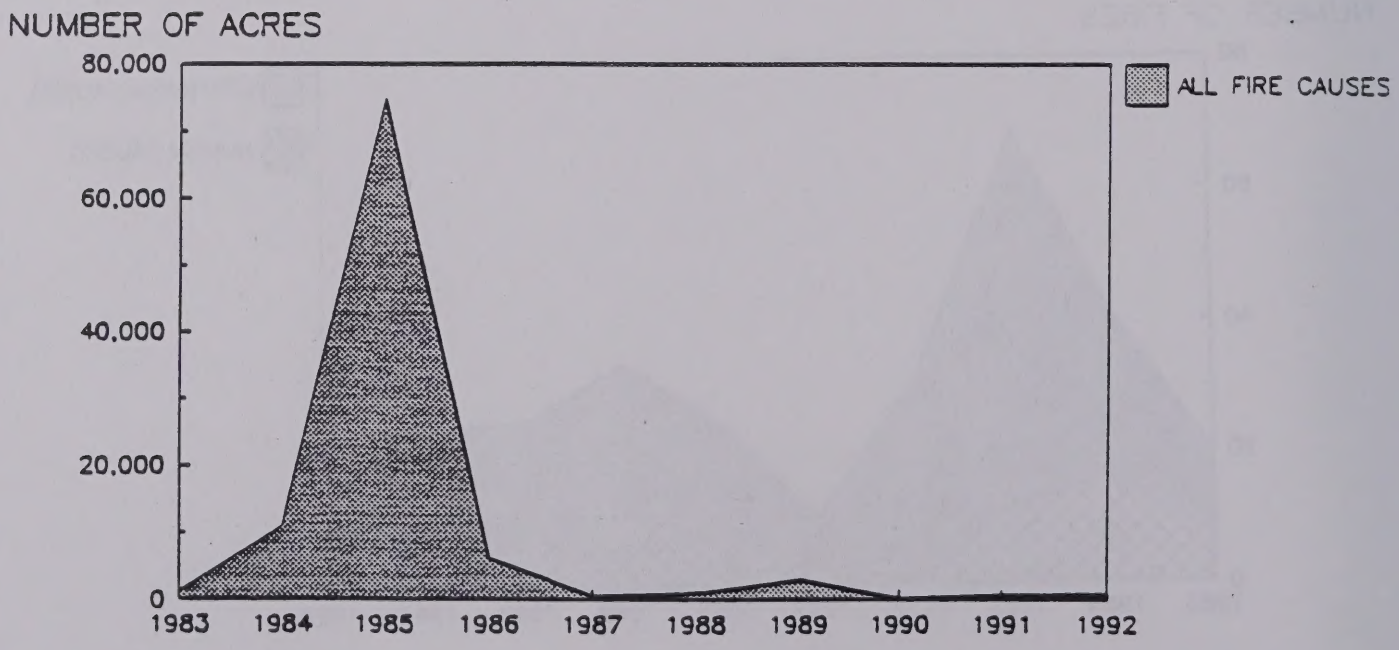


FIGURE 2.

1987	10	608
1988	25	1,050
1989	34	3,068
1990	25	106
1991	25	804
1992	22	909

The Battle Mountain District's Fire Management Activity Plan (FMAP) identified two Fire Management Zones. The zones were developed from similar fire behavior based on vegetative (fuel) profiles and topographical features. Fire Management Zone 1 contains 5 1/2 million acres and the predominate fuel type is annual and perennial grasses with intermixed salt desert shrubs. The terrain is the valley floors to mid-slope and fires are usually small with low intensities unless they occur in areas of continuous grasses. Fire Management Zone 2 contains 5 million acres and the predominate fuel type is sagebrush and grasses at midslope to Pinyon Pine-Juniper at the higher elevations. Large fires can occur when there are continuous fuels. Most of the fire activity occurs in fire management zone 2.

Potential dominant shrub vegetation associated with the two Fire Management Zones include: Shadscale, Budsage, Black Sagebrush, and Wyoming and Mountain Big Sagebrush, Utah Juniper and Pinyon Pine. Potential dominant grasses include: Bottlebrush Squirreltail, Indian Ricegrass, Needle and thread grass, Sandberg's Bluegrass, Thurber's Needlegrass, Bluebunch Wheatgrass, Idaho Fescue and Great Basin Wildrye. Galleta grass is common in the southern part of the District.

The plant communities associated with the two zones are often in early to mid seral stage with a herbaceous understory that is lacking in desirable perennial grasses and forbs and is dominated by cheatgrass and halogeton. Due to past fire activity these cheatgrass monoculture areas are subject to frequent fire activity. An overlay showing fire management zones is available in the Battle Mountain District Office.

Common range sites and habitat types corresponding to the two zones that wildfires have occurred on within the District and have the potential for EFR efforts include but certainly not limited to:

Habitat Type	Range Site
1.(ARTR2-PUTR2/FEID-AGSP)	Loamy Slope 10-16*
Big Sagebrush-Bitterbrush/Idaho Fescue-Bluebunch Wheatgrass	
2.(ARTR2/AGSP-STTH2)	Loamy 10-12
Big Sagebrush/Bluebunch Wheatgrass-Thurber's Needlegrass	
3.(ARTRW/AGSP)	South Slope 8-12
Wyoming Big Sagebrush/Bluebunch Wheatgrass	
4.(ARTR2/STCO4-ORHY)	Sandy 10-12
Big Sagebrush/Needleandthread Grass-Indian Ricegrass	
5.(ARTR2/AGSP-STTH2)	Shallow Loamy 8-12
Big Sagebrush/Bluebunch Wheatgrass-Thurber's Needlegrass	
6.(ARTRW/STTH-AGSP)	Loamy 8-10
Wyoming Big Sagebrush/Thurber's Needlegrass-Bluebunch Wheatgrass	
7.(ARTR2/ELCI2)	Loamy Bottom 10-14
Big Sagebrush/Great Basin Wildrye	
8.(ARTR2/AGSP-STTH2)	Ashy Loam 10-12
Big Sagebrush/Bluebunch Wheatgrass-Thurber's Needlegrass	
9.(ARVA2/ELCI-FEID)	Deep Loamy 16+
Mountain Big Sagebrush/Great Basin Wildrye-Idaho Fescue	

10.(ARVA2/FEID)----------Loamy 16+
Mountain Big Sagebrush/Idaho Fescue
11.(ARVA2/AGSP)----------Loamy 12-16
Mountain Big Sagebrush/Bluebunch Wheatgrass
12.(ARTR2/STCO4-ORHY-AGDA)----------Sandy 8-10
Big Sagebrush/Needleandthread Grass-Indian Ricegrass-Thickspike Wheatgrass
13.(ATCO/ORHY-SIHY)----------Shallow Silty 8-10
Shadscale/Indian Ricegrass-Bottlebrush Squirreltail
14.(ARVA2/AGSP)----------Loamy Slope 12-16
Mountain Big Sagebrush/Bluebunch Wheatgrass
15.(PUTR-ARVA2/AGSP-STTH2)----------Gravelly Loam 12-14
Bitterbrush-Mountain Big Sagebrush/Bluebunch Wheatgrass-Thurber's Needlegrass
16.(ARTRW-EULA5/ORHY)----------Silty Plain 8-10
Wyoming Big Sagebrush-Winterfat/Indian Ricegrass
17.(ARTRW/ELCI-ORHY-AGDA)----------Loamy Fan 8-12
Wyoming Big Sagebrush/Great Basin Wildrye-Indian Ricegrass-Thickspike Wheatgrass
18.(PIMO-JUOS/ARTR2/AGSP-POSA)----------Gravelly Loam 10-16
Singleleaf Pinyon Pine-Utah Juniper/Big Sagebrush/Bluebunch Wheatgrass-Sandberg's Bluegrass.

*average annual precipitation (inches)

E. Battle Mountain District EFR History

Emergency fire rehabilitation in the last ten years has resulted in approximately 5,000 acres of seeding, 12 miles of fence construction and 4 miles of fence repairs. Listed below is a summary of the EFR activities conducted by the Battle Mountain District since 1982.

In terms of acres seeded, these figures represent an average of 5 percent of the burned areas actually being seeded over the 10 year period. Due to time and personnel constraints inherent in the EFR approval process, many proposed EFR seedings have not been implemented. Also, time constraints inherent in the approval process has delayed critical seeding time and adversely impacted the potential success of seedings.

FIRE REHABILITATION SINCE 1982

YEAR	FIRE NAME/REHAB PLAN	SUCCESS/FAILURE
1985	Table Mountain-3,400 acre effort consisting of crested wheatgrass. Four miles fence construction.	Crested wheatgrass/successful.
1990	Walter's Fire-1,500 acres seeded consisting of: 1.Crested Wheatgrass-2#/ac 2.Pubescent Wheatgrass-2#/ac 3.Ladak Alfalfa-2#/ac 4.Small Burnett-2#/ac 5.Antelope Bitterbrush-2#/ac 6.Fourwing Saltbush-2#/ac 3.5 miles of fence was constructed.	Recent monitoring studies showed sparse stands of Crested Wheatgrass, Pubescent Wheatgrass, and Ladak Alfalfa. Very little Small Burnett, Bitterbrush and Saltbush was present. Note-Because of the difficulties inherent in the EFR process, the seeding was not completed in a timely manner.

1991	Fish Creek Fire-70 acres seeded consisting of: 1.Great Basin Wildrye-4#/ac 2.Crested Wheatgrass-5#/ac 3.Pubescent Wheatgrass-5#/ac 4.Ladak Alfalfa-3#/ac 5.Small Burnett-3#/ac	Although it is too early to evaluate, recent monitoring studies showed all seeded species were common to the burned area.
1992	Cottonwood Fire-20 acres seeded consisting of: 1.Great Basin Wildrye-5#/ac 2.Streambank Wheatgrass-5#/ac 3.Ladak Alfalfa-4#/ac 4.Small Burnett-4#/ac In addition, a 50 foot riparian gap fence was constructed.	Too early to evaluate.
1992	Newark Fire-250 acres seeded consisting of: 1.Great Basin Wildrye-1#/ac 2.Bluebunch Wheatgrass-1#/ac 3.Crested Wheatgrass-5#/ac 4.Pubescent Wheatgrass-5#/ac 5.Small Burnett-3#/ac 6.Ladak Alfalfa-2#/ac 7.Bitterbrush-.5#/ac	Too early to evaluate.
1992	Bates Mt. Fire-400 acres	

#/ac=pounds per acre

F. Emergency Fire Rehabilitation Team

The District Manager selects the members of the emergency fire rehabilitation team. The team will usually consist of a range conservationist, wildlife biologist, fire resource advisor, fire management officer, forester, soil scientist (if available), wild horse and burro specialist (if in an herd management area) and if possible the affected permittees. The team determines both on and off site resource damages that are likely to occur and prescribes the measures necessary to minimize the potential resource losses following a wildfire. The team also develops the addendum to this EA. The role and specific responsibility of the team is outlined in Appendix 2.

G. Advance Procurement

Advance procurement actions will be taken to insure that EFR activities proceed smoothly. A "seed bank" has been established at the warehouse at the National Interagency Fire Center (NIFC) for fire rehabilitation projects. On an annual basis, the District will advise the NIFC warehouse of potential seed acquisition for the upcoming year. Estimated costs for seed, equipment, and personnel are listed in appendices 3 and 4.

II. PROPOSED ACTION AND ALTERNATIVES

A broad spectrum of situations and resource values are encountered when assessing EFR needs. For this reason, a variety of practices have been selected as the preferred alternative. Based on 10 years of historical data, a normal fire year consists of approximately 30 fires, burning 9,978 acres. Of this total, natural rehabilitation would occur on

approximately 9,480 acres and approximately 500 acres would be rehabilitated based upon the historical data. Rest for the natural rehabilitation and potential seeding would be provided by approximately 1.5 miles of fence during a normal fire year.

A. Proposed Action

Under this proposal, a variety of practices would be used separately, or in combination, to meet the District's EFR needs. All of these practices will include necessary fence construction (temporary and permanent).

A cultural evaluation will be conducted on all proposed actions resulting in ground disturbance. A cultural inventory strategy plan has been developed for rehabilitation to protect cultural resources from the impacts of the proposed action plan (Appendix 5). Any cultural resources identified during the inventory process would be mitigated and/or avoided in accordance with regulations.

No rangeland seeding and/or fences will be implemented where threatened or endangered plant species are known to exist, without consultation with the U.S. Fish and Wildlife Service in accordance with Section 7 of the Endangered Species Act. Surface disturbances will be avoided in locations of known sensitive plants.

All seed testing for purity, germination, noxious, poisonous and/or prohibited plant species will be done in coordination with the Nevada State Department of Agriculture.

The proposed action is in conformance with the District's Land Use Plans.

Outlined below are four possible options that comprise this alternative.

1. Treatment 1 - Natural Revegetation with Closure

a. Treatment Description

Natural revegetation is the principle rehabilitation method which occurs on 95% of the affected area. This treatment will involve resting the burned area until the native vegetation is successfully re-established. This treatment assumes an adequate seed source is available at the burned area and significant mortality did not occur to the existing perennial vegetation.

Areas of natural regeneration would be closed to livestock grazing for a minimum of two growing seasons; only in areas that can be protected from grazing.

Small burns and areas of complex land status are often not feasible to protect from livestock grazing.

In most situations, this option will be used as a funding vehicle to secure EFR funding (1540 funds) to repair damaged fence and/or to construct either temporary or permanent fencing.

b. Follow Up Management

Preburn management practices would resume when a minimum of two growing seasons of rest has been provided for native species. The emergency closure will be lifted when the vegetative cover meets or exceeds the minimum ground cover for the ecological site after two growing seasons. The community structure analysis (CSA) or step point transect would be the methods used for monitoring vegetative cover and establishment of native species. Adjustment in grazing levels would only be made through monitoring.

c. Rationale

In many cases when given adequate rest, successful reestablishment of native species or rangeland seedings will occur in burned areas, if the perennial plant species were not killed as a result of the fire or if viable and desirable seed or root mass is present. Often burned areas will recover to be in better condition following wildfire. This is a very cost effective action frequently only requiring enough money to repair damaged fencing. Natural regeneration will be the principle rehabilitation method if the burn is in area of steep topography and is inaccessible or in a range site where soil conditions are not favorable for a seeding.

2. Treatment 2 - Planting of Seed Mixtures with Closure

a. Treatment Descriptions

Under this treatment, seeding will only be considered if it is determined by the EFR team that the burned area will not successfully reestablish to a native perennial plant community in a reasonable time frame (usually two to three growing seasons if precipitation is normal), in areas that receive eight inches or more of annual precipitation and if soil conditions are favorable and compatible for a seeding. All seedings will be conducted in accordance with the Standard Operating Procedures as set forth in the applicable Resource Area's Land Use Plan.

Under this treatment, burned areas will be seeded to establish a perennial plant community. Seed mixtures will be modified to meet wildlife and watershed needs. Seed mixtures will generally consist of a wheatgrass species and will always include at least one forb species. A browse species will be planted separately, at strategic locations throughout the rehabilitation area, when warranted by other resource values.

Exceptions for planting shrubs will be where seedling or resprouting browse species will re-establish. Four years of monitoring burns in the Winnemucca District showed the following shrub species naturally recovered: Shadscale and Budsage; and Mountain and Basin Big Sagebrush species. In addition, resprouting and regeneration of bitterbrush and Mountain Mahogany have been observed in the Battle Mountain District.

Burned areas were provided a minimum of two growing seasons rest from livestock grazing to allow for shrub recovery.

If the rehabilitation area is within crucial wildlife habitat, crested wheatgrass cultivars will normally not be included in the seed mixture and a minimum of two to four forbs will be included. This treatment does not preclude the use of a seed mixture consisting solely of native species.

The usual method of seeding will be by rangeland drill at rates between 20 to 25 PLS/sq. ft. A seed dribbler may be used for seeds that will not pass through a rangeland drill. Although drilling seed is the preferred technique, in areas where precipitation is greater than 10 inches certain seed mixtures or species may be planted using broadcast techniques (aerial and hand). The seed may be broadcast aerially from an aircraft or from the back of a pickup truck, all terrain vehicle, or by hand using hand seeders. Aerial seeding will usually be used for burned areas where the topography is too rugged for a rangeland drill. The seed will be covered, unless the seeded area is inaccessible to the necessary equipment and the soil properties are such that the chances of seeding success are good. Broadcast seeding done in Wyoming sagebrush or salt desert shrub communities will be followed by chaining, harrowing or the use of livestock to cover seed in order to improve seedling establishment. Broadcast seeding rates will be double the recommended drill rate. The minimum application rate for drilling seed is 7 lbs. per acre due to the limitations of the rangeland drill. The 7 lbs. per acre rate is adequate for most rangeland drill applications.

The plant species that will be used for EFR on this District can be found in Appendix 6, along with a brief description of their characteristics. Not all of these species appear in the proposed seed mixtures. Those that do not appear in the seed mixtures will be used on a case by case basis as each EFR project requires.

Seeding treatments will be based on major vegetation communities within the burned area. Seeding will not be proposed in burned areas that retain adequate viable native perennials. The pre-burn ecological status is usually early to mid seral.

The following seeding list has been formulated for very board vegetative communities and modifications should be made for wildlife habitat and highly erosive areas. The list is intended as only a guide and may be modified as each EFR situation requires. Parameters such as soil properties, erosion potential, aspect, elevation, intended use, potential plant community, biological diversity, threat to existing watershed, and seed availability and cost will be evaluated when modifying seed mixtures. Probability of fire rehabilitation occurring and potential acres

rehabilitated in the following vegetative communities is based on the 10 year history.

Vegetative Community: Wyoming Big Sagebrush
Precip. Zone: 8-12 inches
Probability of Fire Rehab. 55%
Potential Acres: 275
Grasses:
-Crested wheatgrass (Nordan)
-Hycrest crested wheatgrass
-Great Basin Wildrye
Forbs:
-Ladak alfalfa
-Yellow sweetclover
-Small burnet
-Sainfoin
Shrubs:
-Fourwing saltbush
-Prostrate kochia
-Wyoming sagebrush
-Rubber rabbitbrush

Vegetative Community: Mountain Big Sagebrush
Precipitation Zone: 12-16 inches
Probability of Fire Rehab. 25%
Potential Acres: 75
Grasses:
-Crested wheatgrass (Nordan,Siberian) (Note: Only 1 crested wheatgrass cultivar will be considered in any mix due to the competitiveness of the cultivars).
-Intermediate wheatgrass
-Pubescent wheatgrass
-Basin wildrye
-Western wheatgrass
Forbs:
-Small burnet
-Ladak Alfalfa
-Lewis flax
-Yellow sweetclover
Shrubs:
-Antelope Bitterbrush
-Serviceberry

Vegetative Community: Pinyon Pine/Juniper Woodland
Precipitation Zone: 12-16 inches
Probability of Fire Rehab. 20%
Potential Acres: 50
Grasses:
-Thickspike wheatgrass, critana
-Whitman beardless wheatgrass
-Bluebunch wheatgrass
-Sheep Fescue
-Tall wheatgrass
-Orchard Grass, Piute
Forbs:
-Small burnet
-Sainfoin
Shrubs:
-Antelope Bitterbrush
-Serviceberry

Adjustments for wildlife habitat:
-Crested wheatgrass cultivars will not be included in the seed mixture.
-Big sagebrush (Hobble Creek) and/or four-wing saltbush and/or prostrate kochia will be planted in selected sites within the burn area at a minimum rate of 1# pls per acre. Antelope bitterbrush and serviceberry seedlings will be planted if necessary to restore preburn habitat.
-Percentage and variety of forbs in the seed mixture will be increased to the greatest extent possible.
-Emphasis will be placed on the use of native grasses to the greatest extent possible.

Adjustment for sandy areas:
-Any of the sod forming wheatgrasses will be used possibly in combination with streambank wheatgrass. Quantities of each species will be dependent on site characteristics and seed cost and availability. Total application rates for grasses will be 7# pls per acre.
-Cereal rye may be used as a cover crop to provide soil stability.
-Four-wing saltbush and Indian ricegrass are recommended. Indian Ricegrass should be drilled at a depth of 2 inches.
-The requirement for a forb species in the seed mix and the inclusion of a browse species will be waived if they were planted as a part of the overall rehabilitation effort.

b. Follow Up Management

Seedings will be protected from livestock grazing for a minimum of two growing seasons. The community structure analysis (CSA) or step point transect will be the methods used for monitoring vegetative cover and establishment of seeded species. Production data will be collected on the second year following treatment. Pre-burn management objectives will resume when vegetative cover meets or exceeds the minimum ground cover for the ecological site. Adjustments in grazing levels will only be made through monitoring.

c. Rationale

Areas to be seeded lack perennial species for natural revegetation. The burn area will not successfully reestablish to a native perennial community in a reasonable time frame of 2 to 3 growing seasons. These areas, if left to natural rehabilitation will probably be invaded by less desirable annual species(cheatgrass/halogeton/mustard/Russian thistle). Areas that are dominated by annual species have a high potential for recurring wildfires and eventually degrade the site by eliminating native perennial species. The recurring fires eventually degrade the site beyond the potential to naturally gain the potential ecological community it was once capable of producing.

The success of seedings sown by rangeland drills is usually quite high. Failures can usually be attributed

to lack of moisture, especially in the spring months, though high temperatures, improper seeding depth, high evaporation rates, wind damage to seedlings, and slow growth during the seedling stage are frequent causes of failure (Elko NFRP, 1990). The chances for seeding success is quite high provided the site is capable of supporting a rangeland seeding, the seed is planted at the correct depth and there is little competition from weedy species.

The success of seeding where the seed has been broadcast is frequently low (Winnemucca and Elko NFRP,1990). Depending on soil and moisture conditions, much of the seed that does germinate does not establish due to shallow root development. Aerial seeding where the soils are coarse textured generally results in better success then where the soils are fine textured (Elko NFRP, 1990, and Jim Young 1993, personal communication).

3. Treatment 3 - Planting Native Shrub or Tree Species:

a. Treatment Description

Seedlings of native shrubs or trees may be planted as an EFR measure to restore forest productivity, wildlife habitat and watershed usually in combination with a seeding. If EFR monies are to be used for this type of restoration, adequate justification is required and may be difficult to justify under EFR plans. An additional source of funding for this action would be through other benefitting subactivities or contributions from other agencies.

Seedlings would be hand planted or could be interseeded on slopes less than 20 percent by a tractor pulled planter.

In addition, expedient re-establishment of pinyon pine/juniper woodlands will enhance production of woodland products such as firewood, pinenuts, Christmas trees, and fenceposts.

b. Follow Up Management

All areas with seedlings will be closed to grazing. Normally these areas will have to be closed to grazing for longer than two growing seasons.

All seedlings will be monitored annually at least until the burned area is opened to grazing. The monitoring method used will be project specific, but at a minimum will consist of a representative sampling to determine survival and growth. All monitoring data will become part of the monitoring and EFR files.

c. Rationale

This treatment will usually be implemented to benefit wildlife populations where the loss of the shrub component is considered irreplaceable or to offset the impacts of past fire activity.

Where shrub seedlings have been planted the success has been variable. Moisture again is a critical factor. Damage to seedlings by rodents and other wildlife is also a frequent cause of failure (Elko NFRP 1990).

4. Treatment 4 - Construction of Erosion and Sediment Control Structures

a. Treatment Description

This treatment will be used to build structures for watershed protection. These structures could consist of everything from gabions, retention dams, sediment traps to simple bales of straw placed in drainage. Armoring headcuts with treatments of Enkamat or Curly blanket or contour furrowing may also be implemented to control erosion. However, as the current trend in watershed management is away from structures and land treatments, it is not likely that any structures built under this option would consist of much more than straw bales or simple loose rock structures.

Enkamat is a tough, water permeable polyester fabric. The fabric functions as a soil/water filtration medium used in erosion control. The mat is rolled onto the ground surface and is anchored. Curlex blanket is a polyester fabric combined with straw and is applied in the same manner as Enkamat.

b. Follow Up Management

Follow up management will be dependent upon the types of structures used. All structures will be inspected annually and other major storm events to determine condition of the structure themselves and their effectiveness. A maintenance schedule will be established in the addendum specifying maintenance for each structure and cleaning schedule for sediment traps. The maintenance will continue until accelerated erosion is controlled.

c. Rationale

These structures will prevent accelerated erosion due to the loss of vegetation cover. These structures will aid soil stabilization on steep slopes adjacent to riparian areas, thus maintaining existing site productivity.

The success of structures has been quite variable throughout the Bureau. On the Elko District, an inspection of structures erected in the Dixie Creek area for watershed protection, following a series of wildfires, indicated that out of 27 structures built only 3 were non functioning. The simple straw-bale structures used as a part of another Elko District EFR project in 1986 proved to be quite successful at reducing the velocity of runoff in existing incised ephemeral channels (Elko NFRP, 1990). On the Battle Mountain District, where rock dams and gabions have been used as erosion control devices; gabions have

been more successful than rock dams. It was also found for a rock dam to be successful it needed to be keyed in and stair-stepped have had a well constructed spillway.

5. Treatment 5 Greenstripping

a. Treatment Description

Under this treatment greenstrips (200-300 foot wide strips of fire resistant vegetation) would be designed in the EFR plan for the purpose of stopping advancing future wildfires, containing future wildfires during initial attack, and/or preventing future wildfire from starting. Recommended plant species that have been successfully used in greenstripping in southern Idaho include: crested wheatgrass cultivars, prostrate kochia and other fire resistant forb species. Wherever possible, greenstrips will adjoin existing natural (creeks and rock outcrops) and manmade (cultivation, seeding, and roads) fire barriers. This should reduce greenstrip costs.

Greenstrips could be used in recently burned areas adjacent to crucial wildlife habitat areas or large cheatgrass areas susceptible to reburn. On the Boise District, greenstrips are expected to reduce annual wildfire size and frequency by 25 to 50% depending on fuel loading in and adjacent to the greenstrips and fire weather conditions (Kuna NFRP and Greenstrip Plan, 1987). Greenstrips would either stop fires or would slow them down enough to allow fire suppression crews time to arrive and stop the fire before it burns through the greenstrip.

Seeding procedures will follow those discussed in "planting of seed mixtures with closure".

b. Follow Up Management

Greenstripped areas will be closed to grazing for a minimum of two growing seasons. Where modifying grazing systems or discouraging livestock use by moving water locations would allow for the successful establishment of seeded species the livestock exclusion may be waived. Temporary fencing will be employed if other methods cannot control livestock use on new greenstrips. Grazing will be allowed after monitoring studies indicate the seeding is established. Monitoring studies will continue after seeding establishment to assure overutilization of greenstrip species does not occur. The monitoring plan will also evaluate the effectiveness of established greenstrips in stopping wildfires.

c. Rationale

In cheatgrass dominated areas of southern Idaho, greenstrips have been particularly effective in areas which have a high frequency of fire occurrence. Greenstrips could also be located in areas that would parallel roads and railroad tracks (except where

cultural values have been identified), break up large annual grasslands into smaller units and protect critical existing and restored habitat areas. Cheatgrass areas where shrub reestablishment is occurring naturally will have higher priority for greenstripping than monocultures of cheatgrass with no shrub reestablishment.

B. Crested Wheatgrass Only Alternative

Under this alternative all rehabilitation measures will consist solely of seeding crested wheatgrass or a similar cultivar either with rangeland drills or by broadcast methods. Broadcast seeding would only be done in areas greater than 10 inches precipitation. Application rate would be 8 pounds PLS per acre. All other proposed rehabilitation measures considered in the proposed action will also be proposed in this alternative. This alternative will be considered if it is determined the seeding will meet land use objectives and is cost effective.

C. No Action Alternative

Under the no action alternative there will be no efforts initiated towards rehabilitating the burn areas. All resource damaged by the fire will be left to the process of natural rehabilitation. Livestock grazing will be authorized at the active preference stocking levels and deferment or rest will be required. All resource use will continue as if the fire did not happen.

III. Affected Environment

The draft Shoshone-Eureka Resource Management Plan and Environmental Impact Statement (1983) describes the affected environment for the Shoshone-Eureka Resource Area. The Esmeralda-Southern Nye Proposed Resource Management Plan and Final Environmental Impact Statement (1985), and Tonopah Resource Area Management Framework Plan (1981) describes the affected environment for the Tonopah Resource Area. The discussion that follows gives a broad overview of the two resource areas within the Battle Mountain District. Most of the emphasis will be on the Shoshone-Eureka Resource Area because of the low fire occurrence within the Tonopah Resource Area. A majority of the fires reported in the Tonopah Resource Area over the past 10 years have been in size class A (0.25 acres or less). During the last 20 years, there has not been a fire larger than 1,200 acres.

A. Topography and Climate

The topography of the Battle Mountain District is mostly characterized by north to south tending mountain ranges separated by broad valleys or rolling hills of uplifted tertiary sediments.

The northern part of the District is drained by the Humboldt River Basin and the remainder of the District consists of internally drained valleys.

The climate of the Battle Mountain District is typical of a high elevation semi-arid desert of the Basin and Range Physiographic Province. The landscapes are dominated by flat playas, level basin fill plains and long, gently sloping alluvial fan piedmonts which merge upwards onto relatively broad bedrock pediments. Pediments extend into the mountains. The mountain slopes are sheer and angular with extensive rock outcrops. Elevation ranges from 4,500

feet to 10,000 feet. Temperatures can range in excess of 100 degrees F in the summer to -40 degrees F in the winter. Precipitation patterns vary widely with elevation, ranging from 14 inches in the higher elevations to less than 5 inches in many of the valley bottoms. Most of the yearly precipitation is in the form of winter snows and spring rains with convectional thunderstorms in the summer months producing a small percentage of the annual precipitation. Winds are generally southwesterly averaging six to eight miles per hour.

The southern part of the District is characterized by the Basin and Range Physiographic Province which extends into the Mohave Desert and includes a number of generally north-south oriented mountain ranges and intervening undrained basins. Most of the southern area is over 5,000 feet elevation with mountains extending to 10,000 feet.

B. Soils

The extremes of climate, relief, aspect, and geologic type all combine for a wide variety of soil types. Soils vary widely with differing parent materials, position on the landscape (landform), elevation, slope, aspect and vegetation. Soils range from those on the valley floors that are frequently deep, poorly drained and alkaline with a high salt content to shallow mountain soils formed over bedrock with pH levels near neutral. Of the ten soil orders, most of the soils of the District are Aridisols, Mollisols, and Entisols.

An Order 3 soil survey has been completed on most of the District. The information obtained from the soil surveys is used for evaluating the land-use potential, establishing potential natural plant communities, and developing reclamation and rehabilitation plans.

The soils in the valleys are mainly mineral soils of two types: those which do not have water continuously available for three months when the soil is warm enough for plant growth (Aridisols); and soils showing little evidence of the soil forming process, the development of horizons or layers (Entisols).

In the mountains there are Aridisols and Entisols and some deeper mineral soils with grass cover and a brown surface horizon (Mollisols). Generally Entisols, occur on steep mountain slopes where erosion is active. They also occur on flood plains and alluvial fans where new material is deposited. The Aridisols and Mollisols are older and occur on more stable alluvial fans and terraces.

Soil loss through wind and water erosion is a normal occurrence throughout the District. Portions of certain watersheds exhibit accelerated erosion and posses significant capability for reduction of the erosion rate through various types of land treatments.

Detailed soil information is available in the soil surveys that are listed below.

1. Soil Survey of Lander County, North Part
2. Soil Survey of Lander County, South Part
3. Soil Survey of Diamond Valley Area
4. Soil Survey of Eureka County Area

5. Soil Survey of Esmeralda County
6. Soil Survey of Big Smokey Valley
7. Soil Survey of Northeast Nye County
8. Soil Survey of Northwest Nye County

C. Water

Runoff from mountain ranges provides the major source for the perennial and intermittent streams on the District. Precipitation adds significantly to the ground water reservoirs in the valleys. The ground water resources tapped by wells provide water for domestic use, irrigation of crops, and livestock.

Surface water resources which provide water for domestic use, livestock, wildlife, and recreation consist of streams, ponds, reservoirs, springs and seeps.

Water quality inventories are limited. Available data indicate that waters often exceed the Environmental Protection Agency standards for drinking water. Typical constituents are fecal and total coliform, arsenic, mercury, dissolved solids, manganese, sulfates, carbonates, copper and iron.

Many of the constituents are inherent in the water as a result of natural processes in the aquifer or surface strata. The principal non-point water quality problems are the result of stream bank erosion and sedimentation. Deterioration of watershed vegetative cover has led to increases in sediment yield.

In the Northern portion of the District, there are 159 miles of perennial streams on public lands. Small population of trout occur in a number of streams, most notably those on Roberts Mountain, Shoshone Mountains, Mount Callaghan, and upper Reese River Valley. The most common species are rainbow, brown and brook trout.

D. Air

Northeastern Nevada has good air quality with no ambient air quality standards exceeded. There are localized occurrences of dust caused by high winds, vehicular traffic, construction activities, and mining activity. Local fires sometimes cause a reduction in visibility in limited areas.

E. Vegetation

Ecological site descriptions are available as a part of the soil surveys previously mentioned. These documents provide detailed information regarding vegetative communities. For the purpose of this discussion eleven basic vegetation communities have been identified. Ecological site inventory data is available for most of the Tonopah Resource Area.

1. Greasewood

This community occurs on floodplains and closed-basin bottomlands adjacent to playas. Slopes range from 0 to 2 percent. Elevation are 4,500 to 5,000. The ecological sites associated with this type occur in precipitation zones of 3-5 and 5-8 inches.

This plant community is characterized by black greasewood (Sarcobatus vermiculatus). Vegetation in this type is

normally restricted to coppice mound areas that are surrounded by playa-like depressions or nearly level, usually barren, interspaces. Basin Wildrye (Elymus cinereus) and inland saltgrass (Distichlis spicata) are the most prevalent herbaceous species associated with this community. Saltgrass may extend into the interspace zone in some areas. Potential vegetative composition is about 25 percent grasses, 5 percent forbs, and 70 percent shrubs.

This plant community does not usually burn unless fire spreads into it from the surrounding big sagebrush or salt desert shrub. The recovery potential is dependent upon site potential. Due to low precipitation reseeding is seldom attempted.

2. Salt Desert Shrub

This is the most dominant plant community on the District and occurs on alluvial terraces, fans, and foothills on all aspects. Slopes range from 0 to 30 percent, but slope gradients of 0 to 8 percent are most typical. Elevations are 4,500 to 6,000 feet. The ecological sites associated with this type occur mainly in precipitation zones of 3-5 and 5-8 inches.

The plant community is characterized by shadscale (Atriplex confertifolia) , bud sage (Artemisia spinescens), with some winterfat (Ceratoides lanata). Bud sage and winterfat are palatable salt desert shrub species. Bottlebrush squirreltail (Sitanion hystrix) and Indian ricegrass (Oryzopsis hymenoides) are important grass species associated with this type. Potential vegetative composition is approximately 10 percent grasses, 5 percent forbs, and 85 percent shrubs.

On the Battle Mountain District this plant community will burn during years of above normal precipitation and above normal forage production. However, on normal years it does not burn frequently. Its recovery is dependent upon site potential, but is usually low due to an understory dominated by halogeton and cheatgrass. The recovery potential could improve provided the site has adequate rest from livestock grazing following a burn. The success for a seeding is rare due to low precipitation (Winnemucca NFRP,1990).

3. Big Sagebrush

The second most extensive community in the area, this type occurs on terraces, alluvial fans, and low rolling hills on all exposures. Slopes range from 2 to 50 percent but slope gradients are most typical. Elevations are from 4,500 to 6,000 feet. The ecological sites associated with this type occur mainly in precipitation zones 8-12 inches.

This plant community is characterized by Thurber's needlegrass (Stipa thurberiana), Wyoming big sagebrush (Artemisia tridentata subsp. wyomingensis), Indian ricegrass (Oryzopsis hymenoides), Basin wildrye (Elymus cinereus), bottlebrush squirreltail (Sitanion hystrix), and Sandberg's bluegrass (Poa secunda). Arrowleaf balsamroot (Balsamorhiza sagittata) and tapertip hawksbeard (Crepis acuminata) are important forb species associated with this type. Potential

vegetative composition is about 50 percent grasses, 15 percent forbs, and 35 percent shrubs.

Most of the fires on the Battle Mountain District occur on this vegetative community. Often the post fire recovery potential is low due to an understory vegetation dominated by cheatgrass. However, if cheatgrass is burned off and the seeding is accomplished before cheatgrass regeneration, reasonable seeding success can be expected. Rehabilitation in this community has about a 50-80% chance of success.

4. Low Sagebrush

This type occurs on high mountain ridges, mountain side slopes, and plateaus. Slopes range from 4 to 75 percent but slope gradients of 15 to 50 percent are most typical. Elevations are 5,000 to 9,500 feet. The ecological sites associated with this type occur mainly in precipitation zones 8-12 inches. Soils are often shallow over a calcarious pan which limits effective water holding capacity and seeding success.

This plant community is characterized by Idaho fescue (Festuca idahoensis), low sagebrush (Artemisia arbuscula) and black sagebrush (Artemisia nova). Black sagebrush is common from low arid foothills and ranges to high mountain ridges and is a palatable sagebrush species. Low sagebrush is common in foothills and on mountain slopes above 6,000 feet. Other important grass species are bottlebrush squirreltail (Sitanion hystrix), Cusick bluegrass (Poa cusickii), Sandberg bluegrass (Poa secunda) and pine bluegrass (Poa scabrella). Potential vegetative composition is about 50 percent grasses, 15 percent forbs, and 35 percent shrubs.

This plant community does not carry fire well. Following fire, it usually recovers well with natural revegetation (ELko NFRP, 1990).

5. Mountain Brush

This type occurs on upland terraces and inset mountain valleys and slopes of all aspects. Slopes range from 4 to 50 percent, but are mostly about 30 percent. Elevations are 6,000 to 9,000 feet. The ecological sites associated with this type occur mainly in precipitation zones greater than 12 inches.

The plant community is characterized by Idaho fescue (Festuca idahoensis), bluebunch wheatgrass (Agropyron spicatum), snowberry (Symphoricarpos spp.), antelope bitterbrush (Purshia tridentata) and serviceberry (Amelanchier spp.). Mountain brome (Bromus marainatus), oceanspray (Holodiscus discolor), curleaf moountain mahogany (Cercocarpus ledifolius), mountain big sagebrush (Artmisia tridentata subsp. vaseyana) are other important species associated with this site. A diversity of palatable shrub species dominate the site. Potential vegetation composition is about 55 percent grasses, 15 percent forbs, and 30 percent shrubs.

This plant community has a smaller burn window than those of the lower elevations. Its recovery potential is usually quite high when it does burn (Elko NFRP, 1990).

6. Pinyon-Juniper Woodland

This type occurs in mountainous regions. Slopes range from 30 to 50 percent, but slope gradients of 30 percent are most typical. Elevations are 5,500 to 9,000 feet. The ecological sites associated with this type are usually within the 10 to 22 precipitation zone.

This plant community is characterized by Pinyon Pine (Pinus monophylla) and Utah Juniper (Juniperus osteosperma). The understory, although sparse, consists of bluebunch wheatgrass (Agropyron spicatum), Sandberg's bluegrass (Poa sandbergii), Thurber's needlegrass (Stipa thurberiana), basin wildrye (Elymus cinereus) and needle and thread grass (Stipa comata) and are important species to this site. Juniper and pinyon trees are prevalent enough to dominate these areas; however, big sagebrush (Artemisia spp) bitterbrush (Purshia tridentata) and curleaf mountain mahogany (Cercocarpus ledifolius) can be located within the understory. However, heavily wooded areas provide little forage. Potential vegetative composition is about 40 percent grasses, 15 percent forbs, and 45 percent shrubs and trees.

The pinyon/juniper plant community has the potential to burn intensely provided the right environmental conditions exist. Often the recovery potential is low due to lack of understory vegetation (Elko NFRP, 1990).

7. Meadows

This type occurs along perennial streams, stream terraces, and valley bottoms and around localized seeps and springs. Slope gradients are mostly 0 to 4 percent but may vary between 0 to 15 percent. Elevations are 4,500 to 9,500 feet.

This plant community is dominated by tufted hairgrass (Deschampsia caespitosa). Nevada bluegrass (Poa nevadensis), timothy (Phleum spp.), meadow sedges (Carex spp.) and rushes (Juncus spp.) are important plants associated with this type. Potential vegetation associated with this type is about 70 percent grasses, 25 percent forbs, and 5 percent shrubs.

Alkali meadows are included in this type and occur on valley bottoms at the 4,000 to 5,000 foot elevation. Dominant grasses include inland saltgrass (Distichlis spicata) and basin wildrye (Elymus cinereus).

This vegetative community burns very infrequently on the Battle Mountain District and burns only under unusually dry circumstances.

8. Riparian

The major riparian plants include willow (Salix spp.), wild rose (Rosa spp.), chokecherry (Prunus virganianus), and cattail (Typha). Aspen (Populus tremuloides) and cottonwood (Populus spp.) are often associated with this site.

This community comprises a very small area within the District and does not often burn unless fire spreads into it. Given adequate rest from grazing the recovery potential is good (ELko NFRP, 1990).

9. Annuals

Areas that are burned or overgrazed may be invaded by annual weeds, sometimes nearly to the exclusion of native species. Dominant plants in this type are cheatgrass and/or halogeton. Other plants often present in these areas are Russian thistle (Salsola kali tenuifolia), clasping pepperweed (Lepidium tenuifolia), and tumble mustard (Sisymbrium altissimum).

Although this vegetation type is not considered an ecological site, it is a plant community that accounts for a large portion of the wildfires on the District. The potential for recovery to a perennial plant community following wildfire is low due to the competitiveness of annual grasses and other weedy species, particularly halogeton. However, seeding prescriptions can be associated to site potential.

10. Hot Desert

This plant community occurs near the southern end of the District. Saltbush (Atriplex spp.), galleta (Hilaria jamesii), and Joshua trees (Yucca brevifolia) are common in portions of this vegetative type.

This vegetation type rarely burns and is slow to recover due to sparse vegetation.

11. High Mountain Pine

At the highest elevations, the vegetation ranges from pure stands of mountain mahogany (Cercocarpus ledifolius), limber pine (Pinus flexilis), bristlecone pine (Pinus aristata) and Rocky Mt. Juniper (Juniperus osteosperma). There is little understory vegetation at the upper elevations as shallow soils are replaced by bedrock. Precipitation is usually 18-20 inches.

This vegetation type rarely burns and is slow to recover due to very sparse understory vegetation.

F. Land Treatments

In addition to the native plant communities discussed above, there are large areas of crested wheatgrass (Agropyron cristatum and Agropyron desertorum) seedings. On a District-wide basis, 101,853 acres have been converted to crested wheatgrass plant communities. Below is a breakdown by Resource Area of the acres seeded:

1. Shoshone/Eureka R. A.---79,902 acres

2. Tonopah R.A.----------21,951 acres

G. Wildlife

In the Battle Mountain District there are 73 species of mammals, 231 species of birds, 24 and 7 species of reptiles and amphibians, respectively and 19 species of fish. Only those species of management concern and those that could be affected either in a positive or negative manner by EFR activities will be discussed. A complete list of wildlife species occurring within the District are included in the following publications: Fishes of the Battle Mountain District , Amphibians and Reptiles of the Battle Mountain District, Mammal List for Battle Mountain District, and Bird List for Battle Mountain District. These publications are available at the Battle Mountain District Office.

1. Mammals

The big game mammals of primary concern with respect to EFR projects include mule deer (Odocoileus hemoinus), pronghorn antelope (Antilocapra americana), Desert bighorn sheep (Ovis canadensis), and Rocky Mountain Elk (Cervus canadensis). Mule deer are normally found in the higher elevations during summer months and lower elevations during winter months. Mule deer summer range is characterized by stands of pinyon pine and juniper intermixed with preferred forage shrub species of bitterbrush and serviceberry. Winter ranges are characterized by sagebrushes at mid-slopes and at the lower elevation the salt desert shrub species. Pronghorn antelope are few in numbers and are normally found in the following valleys within the District: Smith Creek Valley, Grass Valley, Antelope Valley, Monitor Valley, Fish Creek Valley, Little Smoky Valley, Kobeh Valley, Reveille Valley, Stone Cabin Valley and Ralston Valley. Pronghorns are dependent upon the sagebrushes and salt desert shrubs with an understory of forbs. Maps showing mule deer migration routes and summer, winter, spring and yearlong mule deer and pronghorn range within the Shoshone/Eureka Resource Area are available in the Shoshone/Eureka Resource Area office. Desert bighorn sheep occur in several mountain ranges within the Tonopah Resource Area located in the southern portion of the District. They are also found in the Desotoya Range (Campbell Creek Area) within the Shoshone/Eureka Resource Area. Adequate forage within a two mile radius of bighorn sheep watering area is critical for survival of bighorn sheep. Rocky Mountain Elk inhabit a small area within the western slope of the Monitor Range in the central portion of the District and are dependent upon the pinyon pine and sagebrush plant communities. Maps are available in the Tonopah Resource Area office showing existing and potential Desert Bighorn sheep, Rocky Mountain Elk and Mule Deer habitat areas.

Other common small mammal species potentially affected by EFR activities include: coyote (Canas latrans), bobcat (Felis rufis), kit fox (Vulpes macrotis), gray fox (Urocyon cinereoargenteus), long-tailed weasel (Mustela frenata), badger (Taxidea taxus), mountain lion (Felis concolor), white-tailed antelope squirrel (Ammospermophilus leucurus), Towsend's ground squirrel

(Spermophilus townsendii), black-tailed jackrabbit (Lepus californicus) and pygmy rabbit (Sylvilagus idahoensis). In addition, shrew, bats and other rodents and weasel species could also be affected by EFR activities.

2. Birds

Major species of game birds likely to be effected by EFR activities include chukar partridge (Alectoris chukar), Hungarian partridge (Perdix perdix), sage grouse (Centrocercus urophasianus), blue grouse (Dendragopus obscurus), California quail (Lophortyx californicus), scaled quail (Callipepla squatmata) and mourning dove (Zenaida macroura). Wintering habitat for grouse is characterized by areas of greatest available canopy cover.

Other common bird species that are likely to be affected by EFR activities include: Golden eagle (Aquila chrysaetos), red-tailed hawk (Buteo jamaicensis), Swainson's hawk (Buteo swainsoni), rough-legged hawk (Buteo lagopus), Cooper's hawk (Accipiter cooperii), prairie falcon (Falco mexicanus), burrowing owl (Athene cunicularia), barn owl (Tyto alba), and great horned owl (Bubo virginianus).

3. Reptiles

Common lizard and snake species that are likely affected by EFR activities include: collared lizard (crotaphytus collaris), yellow-backed spiny lizard (Sceloporus magister uniformis), Great Basin fence lizard (Sceloporus occidentalis biseriatus), northern sagebrush lizard (Sceloporus graciosus graciosus), northern desert horned lizard (Phrynosoma platyrhinos platyrhinos), Great Basin whiptail (Cnemidophorus tigris tigris), Great Basin gopher snake (Pituophis melanoleucus deserticola) and Great Basin rattlesnake (Crotalus viridis lutosus).

3. Fish

The Reese River and its tributaries and Pine Creek and its tributaries are both located in the District and are part of the Humboldt River System. The remaining fish habitat in the District is found in waters of isolated interior basins of central Nevada.

Many fish are known to inhabit the waters of the Battle Mt. District. The most common species include rainbow trout (Salmo gairdneri), brook trout (Salvelinus frontinalis) and brown trout (Salmo trutta). Trout occur in a number of streams, most notably on Roberts Mountain, Shoshone Mountains, Mount Callaghan, and upper Reese River Valley.

H. Special Status Species -(Vertebrates and Plants)

1. Vertebrates

The American peregrine falcon (Falco peregrinus anatum) and the bald eagle (Haliaeetus leucocephalus) are federally listed as "Endangered". The peregrine is an infrequent migrant through the District, while the bald eagle is occasionally observed within the District, however no winter concentrations or roost sites are known to exist.

The Lahotan cutthroat trout is federally listed as "Threatened". This species occurs on the District within the Pete Hanson drainage located in the Roberts Mountains and in the Upper Reese River and Tierney Creek. Several streams flowing off of Mount Callaghan into the Reese River drainage has been identified as historic Lahontan cutthroat trout habitat.

The Railroad Valley Springfish (Crenichthys nevadae) is listed as federal threatened. It is located in several warm springs in Railroad Valley within the Tonopah resource area. The Railroad Valley springfish are very susceptible to water temperature fluctuations caused by overhanging plant growth.

The Mojave population of desert tortoise (Gopherus agassizii) is listed as "threatened" and occur on approximately 70,600 acres at the south end of the District within the Tonopah Resource Area. The goal for Non-Intensive Category III desert tortoise habitat is to limit habitat and population declines to the extent possible by mitigating impacts. In the late spring and summer, tortoise rely on dried grass for forage. They are very susceptible to direct mortality resulting from crushing above ground or in their burrows.

2. Category 2 Vertebrates-A listing of taxa follows for which information now in possession of the U.S. Fish and Wildlife Service indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate preparation of rules.

Spotted Bat (Euderma maculatum)
Desert Valley Kangaroo mouse (Microdipodops megacephalus albibenter)
Fletcher Dark Kangaroo mouse(Microdipodops megacephalus nasutus)
Preble's shrew (Sorex preblei)
Fish Spring pocket gopher (Thomomys umbrinus abstrusus)
San Antonio pocket gopher (Thomomys umbrinus curtatus)
Pigmy rabbit (Sylvilagus idahoensis)
Northern goshawk (Accipiter gentilis)
Ferruginous hawk (Buteo regalis)
Swainson's hawk (Buteo swainsoni)
Western snowy plover (Charadrias alexandrinus nivosus)

Mountain plover (Charadrius montanus)
Black tern (Chlidonias niger)
Loggerhead shrike (Lanius ludovicianus)
Long-billed curlew (Numenius americanus)
Mountain quail (Oreortyx pictus)
White-faced ibis (Plegadis chihi)
Northwestern pond turtle (Clemmys marmorata marmorata)
Chuckwalla (Sauromalus obesus)
Mountain yellow-legged frog (Rana muscosa)
Spotted frog (Rana pretiosa)
White River desert sucker (Catostomus clarki intermedius)
Big Smoky Valley tui chub (Gila bicolor spp.)
Railroad Valley tui chub (Gila bicolor spp.)
Fish Lake Valley tui chub (Gila bicolor spp.)
Monitor Valley speckled dace (Rhinichthys osculus ssp.)
Oasis Valley speckled dace (Rhinichthys osculus ssp.)
Amargosa toad (Bufo nelsoni)
Diamond Valley speckled dace (Rhinichthys osculus ssp.)

3. Plants

Currently there are no plant species federally listed as Threatened or Endangered.

Several species are candidate category 2 species that the U.S. Fish and Wildlife Service requires additional information to determine whether listing is appropriate.

A listing of these species follows:

Eastwood milkweed (Asclepias eastwoodiana)
Black wooly-pod (Astragulas funereus)
Current milk-vetch (Astragulas uncialas)
Tecopa bird's beak (Cordylanthus tecopensis)
Spring parsley (Cymopterus ripleyi var. saniculoides)
Tiem's buckwheat (Eriogonum tiehmii)
Pahute green gentian (Frasera pahutensis)
Golden bush (Haplopappus graniticus)
Dune penstemon (Penstemon arenarius)
Bashful penstemon (Penstemon pudicus)
Mono phacelis (Phacelia monensis)
Blaine's fishhook cactus (Sclerocactus blainei)
Jane's globemallow (Sphaeralcea caespitosa)
Elko rockcress (Arabis falcifructa)
San Pitch Valley milkvetch (Astragalus lentiginosus var. chartaceus)
Goodrich biscuitroot (Cymopterus goodrichii)
Desert whitlowgrass (Draba arida)
Nevada willowherb (Epilobium nevadense)
Windloving buckwheat (Eriogonum anemophilum)
Alpine tonestus (Haplopappus alpinus)

I. Wild Horses and Burros

Free roaming wild horses are common throughout the Battle Mountain District. Burros are less common than horses and are located mostly in the southern portion of the District. The Battle Mountain District-Shoshone/Eureka Resource Area is home to

approximately 3,660 wildhorses plus 20 wild burros distributed in 14 herd management areas (HMA's). Maps are available in the District office showing wild horse herd use area boundaries within the Shoshone/Eureka and Tonopah Resource Areas. The Tonopah Resource Area is home to approximately 1,100 and 335 head of wild horses and burros respectively, and occur in 17 HMA's.
In the Shoshone/Eureka Resource Area Herd Management Areas were established based upon past historical horse use and inventory data gathered from 1972 to 1982. Major problems which may be faced by wild horses in conjunction with EFR projects include the construction of fences that would inhibit free movement to areas of forage and/or water.

J. Wilderness Study Areas and Areas of Critical Environmental Concern

All lands under wilderness review (WSAs) must be managed under the Interim Management Policy (IMP) guidelines until either designated as wilderness or released for multiple-use management by Congress. Many of the WSA's were initially selected for study based on their roadless, primitive character.

There are 3 WSAs in the Shoshone/Eureka Resource Area totalling 108,460 acres and 12 WSAs in the Tonopah Resource Area totalling 613,415 acres. Map 2 shows locations and names of WSAs within the Battle Mountain District.

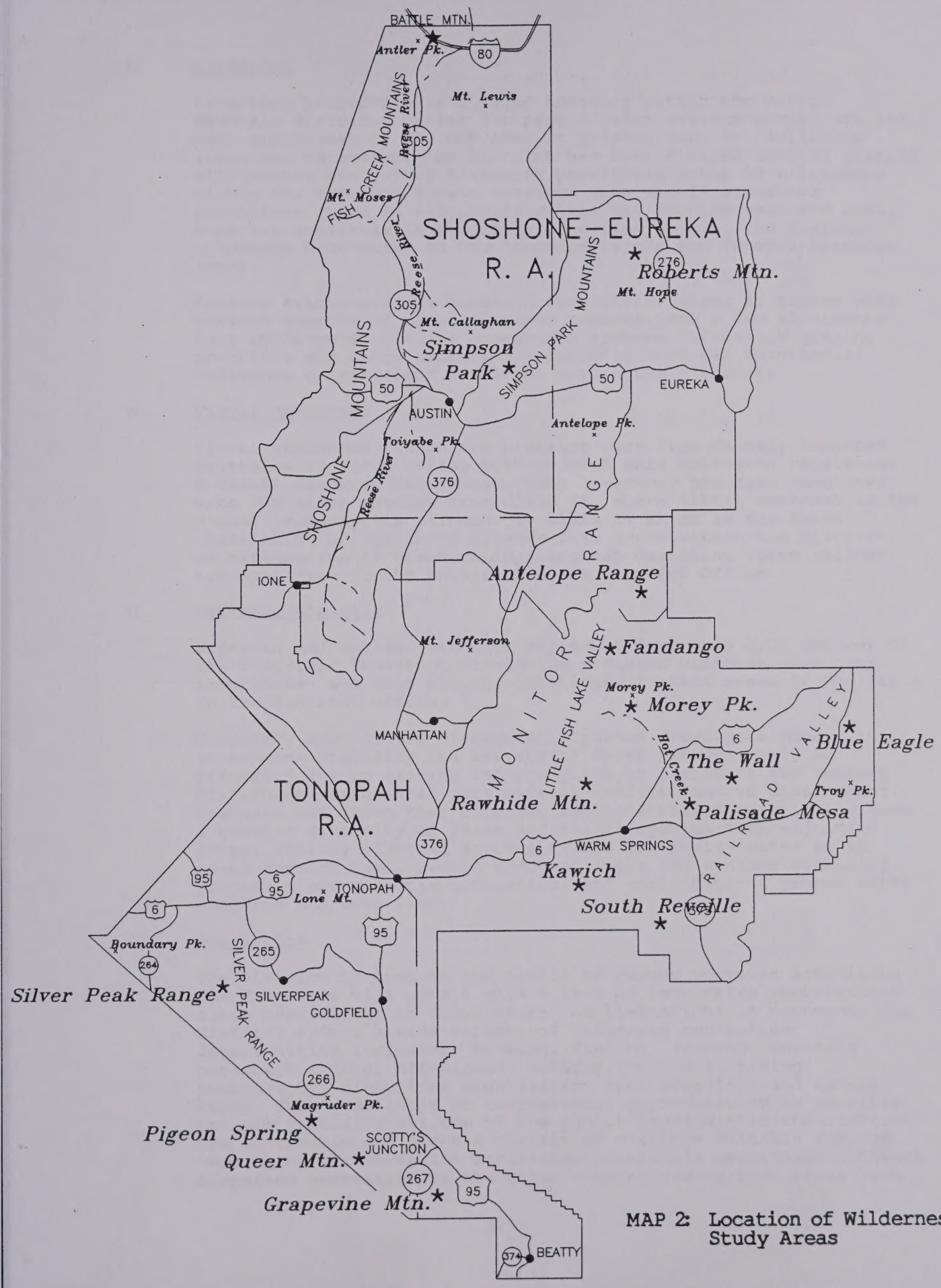
This plan does cover EFR activities within WSAs and IMP guidelines for lands under wilderness review will be followed. In the ten year history no fire rehabilitation treatments have been implemented in WSAs.

Although there are no areas of critical environmental concern (ACEC) designated in the District, there are 10 areas within the Tonopah Resource Area that are nominated to meet the criteria for relevance and importance as an ACEC.

K. Cultural Resources

Almost all cultural inventories in the District has been project specific. As a result, portions of some hydrographic basins have been intensively surveyed for cultural resources while others have received little or no inventory. Less than 2% of the District has been surveyed for historic and prehistoric cultural resources. Historic sites include, but not limited to the remains of homesteads and mining camps, townsites, Chinese borax mines, charcoal kilns and platforms, mining/milling sites, trash dumps, trails, roads, and railroad grades. Prehistoric sites include: long term habitation sites, temporary camps, task specific sites, pinyon caches, scatters of heat altered rock, rock shelters, petroglyphs and pictographs, rock alignments including "geoglyphs", and quarry sites. There are no recorded sacred sites within the District. Potential impacts to cultural resources during EFR activities would be fencing and/or seeding.

Culturally sensitive areas and known areas of cultural resources of previous inventories are plotted on maps and overlays. These overlays provide a data base which might anticipate where mitigation or avoidance may be needed in conjunction with EFR work or where an inventory may be repetitious.



MAP 2: Location of Wilderness Study Areas

L. Livestock

Livestock production is a major industry within the Battle Mountain District. During the past 5 years average actual use has been approximately 300,000 AUMs of grazing use. To facilitate livestock management the District has been divided into 93 grazing allotments. Sixty-four livestock permittees graze 59 allotments within the Shoshone/Eureka resource area and 29 livestock permittees graze 34 allotments within the Tonopah resource area. Maps are available in the District office showing the grazing allotment boundaries in the Shoshone/Eureka and Tonopah Resource Areas.

Grazing allotments are licensed for cattle, sheep or horses with various seasons of use, livestock numbers, and a few allotments have implemented grazing management systems. Livestock grazing practices and range improvement projects have had substantial influence on rangeland condition within the District.

M. Visual Resources

Visual resources within the District vary from densely forested mountains to broad valley bottoms with only scattered vegetation. A Visual Resource Management (VRM) inventory has been completed with VRM class ratings from Class II, where little contrast in the visual landscape is allowed, to class IV which is the least restrictive of the three classes that occur within the District. An explanation of these ratings and map depicting these ratings are available at the Battle Mountain District Office.

N. Wetlands/Riparian

Riparian and wetland habitats represent less than 0.01 percent of the District. Important streamside riparian habitats have been inventoried and maps showing locations of these areas is available in the District office.

Currently most of the streamside riparian areas have poor streambank stability and streambank cover ratings. This is primarily due to grazing and trampling by livestock and surface disturbance associated with mineral exploration and development. Research has shown that riparian habitats characteristically have a greater diversity of plant and animal species than adjoining areas. Healthy riparian systems filter and purify water as it moves through them, reduce sediment loads and enhance stability, provide micro-climatic moderation, and contribute to ground water recharge and base flow.

O. Recreation

The District is open to the public to pursue whatever activities the resources will permit with a lack of regulative restrictions, close confinement to other users, or limitations on movement. The District offers a wide variety of dispersed recreation opportunities including: hunting, fishing, camping, shooting, horseback riding, off-highway vehicle (OHV) use, hiking, photography, historical sightseeing, rock hounding, and nature study. This wide range of recreational opportunities is possible because virtually all the of the public lands within the District are accessible and offer a variety of settings suitable for the vast array of recreation activities previously mentioned. Although dispersed recreation is the rule, several undeveloped areas have

become commonly used for overnight camping, fishing, day-hiking and picnicking. In addition, within the Shoshone/Eureka Resource Area there are two developed campgrounds: the Mill Creek campground located in the Shoshone Range and the Hickison Petroglyph campground located in the Simpson Park Mountain Range.

Each year the Tonopah Resource Area has several OHV-motorized events. Indications are the number of events will probably increase over the next several years due to continuing restrictions on such events in areas with desert tortoise and other resources requiring protection. Also, there are several areas within the Tonopah Resource Area where the presence of high quality natural resources and current or potential demand warrants intensive management practices to protect the areas for their scientific, educational and/or recreational values. These areas are Railroad Valley, Lunar Crater and the Crescent and Clayton Valley Sand Dunes Area.

IV. Environmental Consequences

CRITICAL ELEMENT	AFFECTED		CRITICAL ELEMENT	AFFECTED	
	YES	NO		YES	NO
Air Quality	X		Soils	X	
ACECs		X	Visual Resources	X	
Cultural Resources	X		T&E Species	X	
Farmlands, Prime/Unique		X	Wastes, Hazardous/Solids		X
Floodplains	X		Water Quality	X	
Lands & Minerals		X	Wetlands/Riparian Zones	X	
Nat. Amer. Rel. Concerns	X		Wild & Scenic Rivers		X
Recreation	X		Wilderness	X	
Rangeland Vegetation	X		Wildlife	X	
Forestry	X		Wild Horse & Burro	X	
Topography/Climate		X	Land Treatments	X	
Wetlands/Riparian	X				

A. Proposed Action

1. Direct and Indirect Impacts of the Proposed Action

The impact analysis that follows is organized by each of the practices discussed under the proposed action for each resource discussed in the Affected Environment and assumes that all treatments will be fully successful. As previously addressed, a more detailed impact analysis will be conducted on a site-specific and project-specific bases as a part of the addendum that will be prepared for each EFR project.

Impacts to other resource values are highly variable. Fire intensity, size, site characteristics, season of burn, post fire weather and animal use are just some of the factors influencing the analysis of impacts on resource values. In addition to the above, the implementation of any EFR activities (i.e. treatment options described under the proposed action or the alternatives) will have their own "unique" or varying impacts to resource values.

a. Topography and Climate

The topography and climate will not be impacted with any of the proposed options.

b. Soils

1. Natural Revegetation with Closure

Soil and watershed stabilization would occur with the successful reestablishment of the native plant community. Based on calculations using the Revised SCS Universal Soil Loss Equation, water erosion is expected to be reduced by 75 to 100 percent over a two to three year period and onsite water supply capacity should increase. Wind erosion should also decrease as the native plant community reestablishes (Elko NFRP, 1990).

Some short term soil compaction may result along fences as a result of vehicular traffic involved in construction and repair.

2. Planting of Multiple Species Seed Mixtures

Soil and watershed stabilization would result once the seeding becomes fully established. Both wind and water erosion would be reduced. Since many of the wheatgrass species that would normally be used are not sodformers, the amount of erosion reduction on a burn that would warrant reseeding could be slightly less than for an area that would reestablish naturally. Additionally, the time frame for the full establishment of a seeding could possibly be a year longer than with natural revegetation.

Some slight short term soil compaction could result from fence construction and repair.

3. Planting of Native Shrub or Tree Seedlings

Though the implementation of this action would not be for erosion control purposes, some soil protection would result. Once established, the crowns of the shrubs could reduce rain drop impact and the roots and stems will act to reduce overland flow. The litter accumulation that would build over time could also act to reduce these erosion forces. Cryptogram re-establishment also reduces raindrop impact and surface particle detachment.

4. Construction of Erosion and Sediment Control Structures

Erosion and sediment control structures could have many positive impacts on the soil resource. These impacts would be dependent on the types of structures used, the number of structures and the combination in which they were used.

These structures could decrease sheet and rill erosion, reduce or eliminate gully formation, reduce stream bank cutting, increase water infiltration, raise existing water tables and allow the controlled release of water into streams and channels.

5. Greenstripping

The impacts to the soil resource resting from this action would be similar to that of the "planting of multiple species seed mixtures" option.

c. Water Quality

1. Natural Revegetation With Closure

This action will benefit intermittent and perennial streams that could be affected by conditions created by wildfire through reductions in runoff and sediment yield. This also provides a long term benefit to the aquatic resources, since the burned area will be fully recovered before grazing is resumed. Water quality and quantity will be improved.

2. Planting of Multiple Species Seed Mixtures

This action will likely result in improved water quality in affected streams through reduced runoff and sedimentation.

3. Planting of Native Shrub or Tree Seedlings

Some improvement in water quality could be realized from this action though in most instances it would be minimal.

4. Construction of Erosion and Sediment Control Structures

This action would often be implemented to protect streams and could lead to increased water quality. Due to the broad spectrum of choices available under this action the results could be quite variable though they would be positive. Erosion, runoff, and sediment yield, gulling, development, and stream bank erosion could be decreased. The degree of these impacts would be dependent on the type, number and combination of structures used.

5. Greenstripping

The impacts to water resources resulting from this action would be similar to that of the "planting of multiple species seed mixtures" option.

d. Air Quality

1. Natural Revegetation With Closure

Since this option would not involve any surface disturbance there would be no increases in

particulates except for the increases directly related to the active burning period of the fire.

Allowing the burned area to revegetate would result in a decrease in particulates and reduce the local dust hazard.

Vegetative reestablishment will stabilize blowing soil and ash.

2. Planting of Multiple Species Seed Mixtures

A similar improvement in air quality could be expected with this action as that of natural revegetation. As a perennial plant community becomes established, the increased cover would decrease wind erosion. Some air quality degradation in the form of increased dust and ash would occur during seeding operations.

This action would likely reduce the fire frequency of the project area. This will reduce smoke being released into the atmosphere and the dust hazards that follow a wildfire.

3. Planting of Native Shrub or Tree Seedlings

No significant change in air quality would result from the implementation of this action.

4. Construction of Erosion And Sediment Control Structures

No significant change in air quality would result from the implementation of this action.

5. Greenstripping

The impacts to air resulting from this action would be similar to that of the "planting of multiple species seed mixtures" option.

e. Rangeland Vegetation

1. Natural Revegetation With Closure

Where implemented, this action could lead to the restoration of the natural plant community. In most instances it would allow for the greatest diversity of plant species. This action would allow for a rest period for seeded and surviving perennial species and prompting plant vigor.

2. Planting of Multiple Species Seed Mixtures

This option would likely prevent the burned area from being dominated by a cheatgrass plant community and increasing the likelihood of more frequent fires within the area. The resulting plant community would usually not have the diversity of a native plant community because there would be only three to five species in the seed mixture. In addition, over a period of time selective grazing could further reduce

the diversity of the plant community and decrease the desirable plant species.

3. Planting of Native Shrub or Tree Seedlings

Planting of native shrub or tree seedlings would hasten the establishment of the shrub component of the natural plant community and increase diversity and once established would provide a seed source.

Using seedlings rather than seed would greatly increase the chance of success and reduce the time required for shrub establishment.

4. Construction of Erosion and Sediment Control Structures

In most cases structures would have a minimal impact on vegetation. They could aid in the establishment of planted seed or the reestablishment of the natural plant community by decreasing erosion and increasing the water table. Where water and sediment are retained by these structures reestablishment of plant communities may respond sooner than what would be expected without these structures.

5. Greenstripping

As with the other seeding options, this action could prevent the burned area from being dominated by a cheatgrass plant community. The resulting plant community would usually not have the diversity of a native plant community or the diversity of that under the option of "planting of multiple species seed mixtures". Under this option the seed mixture would consist of predominately perennial introduced grasses with one or two forb and shrub species.

A concerted monitoring and evaluation effort will be initiated to assess species establishment in greenstrips and determine if greenstrips are spreading into adjacent native vegetation stands.

Greenstrips have been effectively established in southern Idaho. The Elko District is currently testing and evaluating the effectiveness of a variety of site preparation methods and plant species used in establishing greenstrips in northern Nevada.

f. Land Treatments

1. Natural Revegetation With Closure

Like native plant communities, rangeland seedings need rest following wildfire. This action would allow burned seedings to recover to the greatest extent. Often seedings are greatly improved following fire since the competition from brush is greatly reduced. Though not an impact from this action, it should be noted that following wildfire, any diversity that might have developed in the seeded area would be temporarily lost.

2. Planting of Multiple Species Seed Mixtures

Seedings usually recover well following wildfire. For this reason, this option would seldom if ever be implemented in an area previously seeded. Consequently there would be no environmental impacts.

3. Planting of Native Shrub or Tree Seedlings

Where implemented, this option would add to the diversity of previously established seedings.

4. Construction of Erosion and Sediment Control Structures

The impacts of this treatment would be similar to that discussed under "Vegetation" above.

5. Greenstripping

The impacts associated with this option would be similar to those discussed under the "planting of multiple species seed mixtures" treatment discussed under the proposed action.

g. Wildlife

1. Natural Revegetation With Closure

If this option were initiated there would be an adequate perennial grass, forb and shrub seed source for the desirable species to reestablish the site with a subsequent increase in forage production. Though production varies greatly by habitat type, herbaceous production can be expected to increase significantly several years following a wildfire. Pronghorn Antelope habitat could increase with the potential increase in forb production.

This action would allow the shrub component to reestablish on the burned area. Valuable mule deer winter habitat could be restored by providing thermal, fawning and escape cover. Sage grouse are also dependent upon sagebrush for forage. The potential for sediment damage to fisheries would be lessened with this action.

Required fencing would have a minimal impact on wildlife providing applicable stipulations are adhered to.

A negative impact could occur if an adequate perennial grass, forb and shrub seed source were not available and a cheatgrass monoculture were to establish on the burned area. The cheatgrass monoculture would lack desirable species diversity and subsequently provide poor wildlife habitat for some wildlife species.

2. Planting of Multiple Species Seed Mixtures

Forb and browse seed mixtures would be selected that would have the most benefit to wildlife. In many

instances, the greatest negative impact associated with this option would be decreased plant diversity, compared to that of a native plant community. Because of poor range condition, most of the potential EFR areas that would be seeded are often lacking in desirable grasses and forbs because they are in a early to mid seral ecological stage.

Although critical big game thermal, fawning, and escape cover could be lost the potential exists to improve wildlife habitat within an allotment by shifting the growing season grazing pressure to the EFR seeding.

If fisheries were threatened by conditions created by wildfire, this action could have a positive benefit by stabilizing the watershed and reducing sediment yield and flooding hazards.

3. Planting of Native Shrub or Tree Seedlings

The initiation of this action would be for the benefit of wildlife. Shrub seedlings would provide browse and cover in a shorter time by hastening the time for the shrub component to establish.

By providing a seed source, the eventual recovery of the burned area with the associated wildlife benefits would be hastened. This action would also offset many of the negative impacts associated with rangeland seedings by promoting a diversity of plant life forms.

4. Construction of Erosion And Sediment Control Structures

This action would have minimal impact on terrestrial wildlife. The watershed stabilization offered by these structures would benefit wildlife by allowing burned areas to recover. Fisheries would likewise benefit from improved watershed conditions by reducing sediment yield and turbidity.

5. Greenstripping

The lack of species diversity and shrub cover will impact wildlife to a similar degree as was identified under the "wildlife" section in the "Crested Wheatgrass Only Alternative".

However, in areas that are in crucial wildlife habitat or bordering crucial wildlife habitat, fire resistant shrub species could be added to the seed mixture. Key shrub species that have been used on the Boise BALM District include Nutall's saltbush, winterfat, and prostrate kochia.

Greenstrips located adjacent to crucial wildlife habitat would reduce the spread of wildfires in wildlife habitat thus slowing the loss of important big game, small mammal and raptor habitat. Every effort would be made to ensure that the greenstrip

does not have islands of flammable shrubs that would carry the fire through the greenstrip.

h. Threatened or Endangered Species

1. Natural Revegetation With Closure

This action could have a positive impact on threatened or endangered (T/E) plant species by allowing them to reestablish along with the native plant community. However, increased plant competition could result due to increased establishment of undesirable plant species.

The bald eagle and peregrine falcon could benefit from this action if the rehabilitation area provided a food source, cover and nesting habitat as native vegetation recovers.

The desert tortoise could also benefit if the rehabilitation area provided a food source and cover or some similar benefit.

This action could also benefit Lahonton cutthroat trout and any of the sensitive aquatic species by stabilizing the watershed.

2. Planting of Multiple Species Seed Mixtures

This action could severely impact any T/E plant species within the rehabilitation area. As a result of increased competition, the chances would be great that T/E plants within the treatment area would be outcompeted and not reestablished. Also, ground disturbing activities could adversely impact established T/E plant species.

This action would likely have a minimal impact on bald eagles. A long term impact could result if shrub species were not a part of the seed mixture because without cover the rodent and lagamorph populations would be slower to recover.

Land treatments would probably not occur in desert tortoise habitat because of the obvious severe direct impacts seeding would have on the tortoise and the likelihood of a unsuccessful seeding in a low rainfall area.

Peregrine falcons would be positively impacted by this action as prey habitat would be improved.

Lahontan cutthroat trout and the sensitive aquatic species could be positively impacted by this action since it would result in watershed stabilization.

3. Planting Of Native Shrub or Tree Seedlings

No impacts to T/E plant species are expected as a result of this action.

The impacts of this action would be minimal for peregrine falcons and Lahontan cutthroat trout. Some positive benefits could result for bald eagles, since once the shrubs are established, a more suitable habitat could be created for small mammals and other food sources. In addition, native shrubs and tree seedlings planted along riparian areas could stabilize stream temperatures and reduce sedimentation.

This action would not occur in desert tortoise habitat because of the reasons previously stated under "planting of multiple species seed mixture".

4. Construction of Erosion and Sediment Control Structures

Few impacts to T/E plant species are expected as a result of this action.

Lahonton cutthroat trout populations could benefit from watershed stabilization or stream improvement as a result of structures.

5. Greenstripping

The impacts to T/E animals and plants resulting from this action would be similar to that of "planting of multiple species seed mixtures option".

i. Wild Horses and Burros

1. Natural Revegetation With Closure

The most negative impact resulting from this action would result from the required fencing used in conjunction with its implementation. Both permanent and temporary fences would restrict the movement of wild horses and could cause injuries. Proper project design could eliminate some of the fence related hazards.

The reestablishment of the native plant community could provide a stable source of forage and with the subsequent increase in forage less livestock competition for forage could possibly occur.

2. Planting of Multiple Species Seed Mixtures

Wild horse populations could benefit from the reliable forage source that this action would provide. Again, the greatest impact of this action would be that of any required fencing, with similar impacts as those discussed "natural revegetation with closure".

3. Planting of Native Shrub or Tree Seedlings

Since this action would not be initiated to benefit wild horse populations the impacts on wild horses would be minimal.

4. Construction Of Erosion and Sediment Control Structures

Erosion and sediment control structures would have a minimal effect on wild horse populations other than the positive impacts of watershed stabilization.

5. Greenstripping

The impacts to wildhorses resulting from this action would be similar to that of the "planting of multiple species seed mixtures".

j. Wilderness Study Areas

1. Natural Revegetation With Closure

This is the treatment that would most often be implemented in the WSA's following non-impairment guidelines.

The impacts of any required fencing would be temporary. During the time that it is in place, it could detract from the wilderness character of the area by highlighting man's influence.

2. Planting of Multiple Species Seed Mixtures

This treatment would only be implemented in cases of extreme emergency. It would have minimal impact on the wilderness values because the plant species used would only be those native to the burned area.

3. Planting of Native Shrub or Tree Seedlings

This treatment would also only be implemented in cases of extreme emergency. Since only species native to the burned area would be used wilderness values associated would not be impacted.

4. Construction of Erosion and Sediment Control Structures

This treatment would only be implemented in cases of extreme emergency. Any structures would likely be only temporary. If used with extreme discretion, wilderness values would not be impacted.

5. Greenstripping

This action would not have any impact on WSA's since it would not be implemented in these areas.

k. Cultural Resources and Native American Religious Concerns

1. Natural Revegetation With Closure

The only impact to cultural resources and Native American Religious Concerns resulting from this action could be due to the construction of required fencing. Transportation of crews, materials and equipment could break and displace cultural artifacts. Illegal

collection by construction crews could also occur. In addition, trampling by livestock along fencelines could also occur. Any possible negative impacts should be mitigatable through a cultural survey.

2. Planting of Multiple Species Seed Mixtures

No negative impacts are anticipated to cultural resources or Native American Religious Concerns, if a cultural survey and standard stipulations are adhered to. However, there is the potential for similar damage to occur with seeding as there was with fence construction for the previously mentioned under "natural revegetation with closure".

3. Planting of Native Shrub or Tree Seedlings

No significant impacts to cultural resources and Native American Religious Concerns are expected with the implementation of this action since this work would usually be conducted with hand crews. However, there is the potential for similar damage to occur with hand planting as there was with fence construction for the previously mentioned reasons under "natural revegetation with closure". Any negative impacts would be minimized by adhering to applicable project stipulations.

4. Construction Of Erosion And Sediment Control Structures

Adequate cultural survey and inventory would be possible due to the limited size of these structures. Therefore, the implementation of this action would result in minimal impacts to cultural resources and Native American Religious Concerns by adhering to applicable stipulations.

5. Greenstripping

The impacts to cultural resources and Native American Religious Concerns resulting from this action would be similar to that of the "planting of multiple species seed mixtures" option.

1. Livestock

1. Natural revegetation With Closure

In the long term, the affected permittee and/or permittees would benefit from this action since the long term result should be increase amounts and diversity of forage. The permittee/permittees may be responsible for fence maintenance and proper livestock management of the rehabilitated area.

During the time the burned area is closed to grazing the permittee/permittees could be adversely affected if he has to pay for private pasture or reduce the numbers of livestock. The extent of this impact would depend on the size of the area closed to livestock grazing and the number of livestock affected.

2. Planting of Multiple Species Seed Mixtures

In the long term, the affected permittee/permittees could benefit the most from this action due to increased forage production. The species diversity of this option could have some positive benefits to the livestock and increase the overall production of the seeding. The impacts of closing the burned area would be similar to those analyzed under "natural revegetation with closure".

3. Planting of Native Shrubs or Tree Species

The planting of shrubs would have less of an impact than grasses or forbs on the livestock industry other than the impacts of the required closure to grazing. Since shrubs usually need more than two or three years to fully establish, portions of the burned area could possibly be closed to grazing for five years or longer (Elko NFRP, 1990).

4. Construction of Erosion And Sediment Control Structures

This option would have minimal impact on the livestock industry other than the benefits derived from watershed stabilization.

5. Greenstripping

The impacts to the livestock industry resulting from this action would be similar to that of the "planting of multiple species seed mixtures" option. In addition, the greenstrips would provide a more stable forage base for livestock after annual vegetation is replaced by perennial species. Many of the greenstrips species are palatable to livestock and wildlife.

The stability of the livestock operations could be improved by the reduction in large wildfires in areas protected by greenstrips and a dependable forage base in the seeded area.

The livestock operator may be adversely impacted if it is determined through monitoring that excessive grazing is occurring and the greenstrip is at risk of being overutilized by livestock.

m. Visual Resources

1. Natural Revegetation With Closure

No long term impacts to visual resources are likely to result with this action since the burned area would reestablish to the natural community. The mosaic contrast caused by the burn could be viewed as pleasing by many observers. Required fencing could result in the introduction of a new line onto the landscape and detract from the visual resource.

2. Planting of Multiple Species Seed Mixtures

Some visual contrast would be created due to the vegetation contrast and the drill rows. These impacts would be reduced by working drill rows into the fire line and with the contour in such a way as to avoid a straight line effect and adhering to the other applicable project stipulations. Depending on the forb species used, most observers would find the landscape visually pleasing during the time of the year they were in bloom.

Again, required fencing could result in a new line being added to the landscape.

3. Planting of Native Shrub and Tree Seedlings

No significant impacts to visual resources are expected if this action is implemented since the addition of native shrubs would restore some of the original character to the landscape. Shrubs should not be planted in rows.

4. Construction of Erosion and Sediment Control Structures

The visual impacts of erosion and sediment control structures would be minimal, providing applicable VRM guidelines are adhered to in designing the structures.

5. Greenstripping

The impacts of the visual resource resulting from this action would be similar to that of the "planting of multiple species seed mixtures" option except that all greenstrips may not be planted on the contour. Strips of vegetation located near the boundary of burns or adjacent to crucial habitat may dominate the landscape and may not be viewed as pleasing by some observers.

n. Wetlands/Riparian

1. Natural Revegetation With Closure

Where implemented, this action could lead to the restoration of the natural vegetation associated with wetlands/riparian areas. In most cases it would allow for the greatest diversity of plant species. This action would allow for a rest period for surviving perennial species and promoting plant vigor.

2. Planting of Multiple Species Seed Mixtures

This option would likely prevent the burned riparian area from being dominated by cheatgrass and other weedy species. The resulting plant community would usually not have the diversity of a native plant community. In addition, over a period of time selective grazing could further reduce the diversity of the plant community and decrease the desirable plant species.

3. Planting of Native Shrub or Tree Seedlings

Planting of native riparian shrub or tree seedlings would hasten the establishment of the shrub and tree component of the natural riparian community, increase diversity and provide a seed source.

Using shrub and tree seedlings in riparian areas rather than seed would greatly increase the chance of success and reduce the time required for shrub and tree establishment.

5. Construction of Erosion and Sediment Control Structures

Structures in riparian areas would have a positive impact on riparian vegetation. The structures would aid in the establishment of riparian planted species or the reestablishment of natural riparian plant community by decreasing erosion and increasing the water table. Where water and sediment are retained by these structures reestablishment of riparian plant communities may respond sooner than what would be expected without these structures.

6. Greenstripping

Establishing a greenstrip adjacent to a riparian could prevent the spread of future fires into critical wildlife habitat areas.

o. Floodplains

1. Natural Revegetation With Closure

Where implemented, this action could lead to the restoration of the natural vegetation within the floodplain. The impacts of this treatment would be similar to that discussed under "Vegetation" section.

2. Planting of Multiple Species Seed Mixtures

This option would likely prevent the burned floodplain area from being dominated by a cheatgrass plant community and increasing the likelihood of more frequent fires within the area. The impacts of this treatment would be similar to that discussed under the "Vegetation" section.

3. Planting of Native Shrub or Tree Seedlings

Where implemented, this option would add to the diversity of previously established seedings.

4. Greenstripping

The impacts of this treatment would be similar to that discussed under "Vegetation".

p. Forestry

1. Natural Revegetation with Closure

Where implemented in burned pinyon/juniper areas, this action could lead to the restoration of the natural community. In most instances it would allow for the greatest diversity of plant species. This action would allow for natural succession eventually leading to the climax pinyon/juniper forest.

2. Planting of Multiple Species Seed Mixtures

This option would likely prevent the burned area from being dominated by a cheatgrass plant community which could eliminate the reestablishment of pinyon/juniper because of more frequent fires and spring competition for moisture. The resulting plant community from the seed mixtures would usually not have the diversity of a native plant community but could supply the protection needed to reestablish pinyon/juniper seedlings.

3. Planting of Native Shrub or Tree Seedlings

Planting of native tree seedlings would hasten the establishment of the forest ecosystem in the natural plant community. Once the trees become established, a seed source would be provided.

Using seedlings rather than seed would greatly increase the chance of success and reduce the time required for tree establishment.

4. Construction of Erosion and Sediment Control Structures

This action would have minimal impacts on forestry.

5. Greenstripping

The impacts of this treatment would be similar to that discussed in the "planting of multiple species seed mixture" option.

q. Recreation

1. Natural Revegetation with Closure

Where implemented this action could adversely impact the following recreation activities: camping, fishing, hunting, hiking, rock hounding, photography, horseback riding, historical sightseeing, nature study, OHV/motorized use, and OVH/non-motorized use. In most instances fence construction would have the most negative impact on all recreation activities. Eventual wildlife habitat restoration would have a positive impact on hunting, fishing, photography, and camping.

2. Planting of Seed Mixtures with Closure

The impacts to hunting, fishing, photography and camping using this treatment would occur for the reasons discussed under "wildlife" and "visual resources" above. Fence construction would have the most negative impact on recreation activities.

3. Planting of Native Shrub and Tree Seedings

The impacts to hunting, fishing, photography and camping using this treatment would occur for the reasons discussed under "wildlife" and "visual resources" above. Fence construction would have the most negative impact on recreation activities.

4. Construction of Erosion and Sediment Control Structures

The impacts to recreation would be minimal using this treatment except fish and aquatic would probably improve.

5. Greenstripping

The impacts to recreation would be minimal using this treatment. Fence construction would have the most negative impact on recreation activities.

2. Cumulative Impacts of The Proposed Action

The implementation of the proposed action will promote watershed stabilization and species diversity, thus reducing the adverse impacts of wildfire on resource values in the long term. Approximately 5 percent of area burned in the last ten years has been reseeded averaging about 500 acres per year. The success ratio during this same time period has been approximately 70%. Therefore, an average of 350 acres per year have been converted to seedings during this 10 year period. Providing this trend continues, the Battle Mt. District can expect to convert 3,350 acres to seedings in the next 10 years.

If the EFR seeding is successful, the following cumulative positive benefits would be gained as a result of reestablishing perennial vegetation to the site.

1. Fire frequency in the EFR area would be lowered by reducing the amount of highly flammable annual plants that invade an area after a fire.

2. The soils on the site would be stabilized with more desirable vegetation in one or two years following seeding establishment.

3. There would be more stable and increased forage supply and an improvement in the quality of forage for livestock and wildlife.

4. Noxious weed infestation would be reduced or prevented on areas adjacent to existing infestations.

5. Critical vegetative components of crucial wildlife winter ranges would be restored much more quickly than with natural regeneration.

6. The adverse visual impacts of fire scars would be quickly corrected with improved scenic quality resulting from the establishment of desirable vegetation.

7. Greenstrips would reduce annual wildfire size and frequency by stopping fires or slowing them down enough to allow fire suppression crews to arrive and suppress the fire. Greenstrips could be used to prevent the loss of wildlife habitat and wildlife and livestock foraging areas.

   Additional benefits of a greenstrip are: reduced cost of fire suppression and subsequent rehabilitation, reduced loss of desirable plant species, reduced noxious weed infestation by protecting existing competitive vegetation, and enhanced visual resources by reducing the size and number of wildfires.

B. Crested Wheatgrass Only Alternative

The discussion that follows is intended to analyze the environmental impacts associated with the implementation of the Crested Wheatgrass Only option. As with the proposed action, each resource discussed in the Affected Environment section will be included in the analysis and full success will be assumed.

1. Direct and Indirect Impacts of this Alternative

a. Topography and Climate

This alternative will have no effect on topography or climate.

b. Soil

The impacts to the soil resource resulting from this alternative would be similar to that of the " planting of multiple species seed mixtures" option under the proposed action.

c. Water

The impacts to water resources resulting from this alternative would be similar to that of the " planting of multiple species seed mixtures" option under the proposed action.

d. Air

The impacts to air resulting from this alternative would be similar to that of the " planting of multiple species seed mixtures" option under the proposed action.

e. Vegetation

As with the seeding option under the proposed action, this alternative could prevent the burned area from being dominated by a cheatgrass/halogeton plant community.

The greatest impact associated with this alternative would be the lack of species diversity and decreased cover for wildlife species. Due to the competitive nature of crested wheatgrass it will likely be the dominant species in the long term, though cheatgrass could also be present.

The shrub component, usually Wyoming big sagebrush, will reestablish given adequate time. The time required for reestablishment of these species will be dependent on such factors as precipitation zone, soil depth and water holding capacity and the proximity of a seed source. A time-frame of 20 years or more is not unusual for the reestablishment of sagebrush in crested wheatgrass seedings (ElKO NFRP, 1990).

f. Land Treatments

The impacts associated with this alternative would be similar to those discussed under the "planting of multiple species seed mixture" treatment discussed under the proposed action.

g. Wildlife

The lack of species diversity and the shrub cover in the plant community causes a similar lack of diversity in the animal kingdom. Following conversion to a crested wheatgrass type, most species of wildlife can be expected to decrease in numbers and diversity.

Though many species could be impacted by implementing this alternative, the effects on mule deer and sage grouse could be the greatest. The shrub component, often Wyoming sagebrush, is important to mule deer for forage, thermal and fawning cover. If the seeding is large enough there could be increased winter mortality and over time the herd could migrate to other areas. This migration could in turn place increased pressure on existing herds resulting in a degradation of the existing habitat with long term effect of decreased herd numbers.

Sage grouse depend upon big sagebrush for forage and cover. However, as with any seeding, the potential exists to improve other crucial wildlife habitat by using the new seeding to implement changes in grazing management.

The impacts of fencing would be similar to that discussed under the proposed alternative.

h. Threatened or Endangered Species

The impacts to T/E animals resulting from this alternative would be similar to that of the " planting of multiple species seed mixtures" option under the proposed action. Since shrub species would not be included in the seed mixture many of the negative impacts would not be mitigated.

Impacts to bald eagles and peregrine falcons would depend on the response of the plant community after fire. A monoculture of cheatgrass would result in lower prey abundance for eagles and peregrines. If the native community follows fire, only a short term impact would be expected.

This action would not impact the Desert Tortoise because of the low precipitation that occurs within the habitat.

i. Wild Horses

The impacts to wildhorses resulting from this alternative would be similar to that of the "planting of multiple species seed mixtures" option under the proposed action.

j. Wilderness Study Areas

This alternative would not have any impact on WSAs since it would not be implemented in these areas.

k. Cultural Resources

The impacts to cultural resources resulting from this alternative would be similar to that of the "planting of multiple species seed mixtures" option under the proposed action.

l. Livestock Industry

The impacts to the livestock industry resulting from this alternative would be similar to that of the "planting of multiple species seed mixtures" option under the proposed action.

m. Visual Resources

The impacts to the visual resource resulting from this alternative would be similar to that of the "planting of multiple species seed mixtures" option under the proposed action except that there would not be a period during which flowering forbs could dominate the landscape. The monoculture and subsequent lack of diversity would allow only one color to dominate the landscape and may not be viewed as pleasing by some observers.

n. Wetlands/Riparian

The impacts to wetlands/riparian areas resulting from this alternative would be the same as that described under the "vegetation" section previously discussed.

o. Floodplains

The impacts to floodplains resulting from this alternative would be the same as that described under the "vegetation" section previously described.

p. Forestry

The impacts to forestry resulting from this alternative would be similar to that of the "planting of multiple

species seed mixtures" option under the proposed action. However, there would be less species diversity.

q. Recreation

The impacts to recreation (particularly hunting, fishing, and photography) would occur for the reasons described under the "wildlife" and "visual resources" sections. The impact of fencing would be similar to that described under the proposed alternative.

2. Cumulative Impacts of Crested Wheatgrass Only Alternative

Many of the cumulative effects of crested wheatgrass would be mitigated by the flexibility of the proposed action. The inclusion of forbs and even browse species could often reduce the time frames for the rehabilitation areas to regain diversity. This would be especially true where shrub seedlings were planted. In wildlife areas this option would allow for the flexibility to design a rehabilitation plan that takes into account wildlife values.

C. No Action Alternative

1. Direct and Indirect Impacts of this alternative

The impacts of not implementing any EFR measures could be quite variable. There would be situations where the native plant community would reestablish. However, by not closing the area to livestock grazing this response would likely be suppressed. This analysis will consider the situation of a site that becomes dominated by an annual cheatgrass and halogeton community, since this is the situation most often encountered on the Battle Mountain District.

This alternative could lead to an increase in cheatgrass and halogeton dominated plant communities. This could result in an increase in fire activity with increased suppression costs for the Bureau. In addition, many of the fires originating in these cheatgrass dominated areas could likely spread to shrub dominated areas previously unburned.

In addition, without planting greenstrips the size and numbers of wildfires in the Battle Mountain District will continue to increase. Fire suppressions and EFR costs will escalate and resource values will continue to be lost.

a. Topography and Climate

This action will have no impact on topography. It's not likely that this alternative would have an adverse effect on climate.

b. Soil

A cheatgrass plant community generally provides protection from the erosive forces of wind and water. Areas that have been dominated by cheatgrass for extended periods of time, often have a thatch layer of caryopsis and dead grass that provides more erosion protection.

The erosion hazard associated with the "No Action" alternative is usually the result of the increased fire activity. During the time that the soil is bare it would be susceptible to increased water and wind erosion with a subsequent reduction of soil productivity.

c. Water

The increased fire activity associated with this alternative could impact water quality due to increased transported sediments. However, impacts could be quite variable as discussed in "Vegetation" section e below.

d. Air

An increase in fire activity would impact air quality through increased smoke and dust. Localized dust hazards often have the potential to severely disrupt travel on roads and highways.

e. Vegetation

The vegetation impacts of implementing this option would be quite variable. Certain plant communities would recover excellently provided there was a significant stand of perennial plants on the site before the burn and these existing plants were not killed by the fire. On smaller fires, where it would not be feasible to close an entire allotment or construct a fence, grazing pressures would limit the degree of recovery even on the favorable sites.

On those sites that are in early to mid seral stage, with few perennial grasses, the chances are good that the burned area could become dominated by cheatgrass. In light of increased fire activity and the competitive nature of cheatgrass, the shrub component would likely be slow to reestablish, if it were to recover at all. Once a site becomes dominated by cheatgrass or halogeton it is difficult and expensive to alter the vegetation to a perennial grass stand particularly in draughty locations.

f. Land Treatments

This action should not have any impact on existing land treatments and it would not add to the number of acres converted to cultivars of crested wheatgrass.

g. Wildlife

Like the "crested wheatgrass only alternative", this alternative could result in a decrease of suitable habitat for many wildlife species. The lack of diversity in a cheatgrass community and the lack of shrub cover can be expected to reduce the numbers of wildlife species. This is apt to be a long term impact due to frequent burn cycle of many cheatgrass areas. Fires originating in these areas are likely to spread into desirable wildlife habitat.

Fisheries could be adversely impacted from increased runoff and sediment yield.

However, impacts to wildlife and fisheries could be quite variable as discussed in "Vegetation" section e above.

h. Threatened or Endangered Species

The competitive nature of cheatgrass could make it difficult for T/E plant species to reestablish following wildfire.

Bald eagles and peregrine falcons would not be impacted by this alternative.

Desert tortoise would not be impacted by this activity.

Lahonton cutthroat trout and fish species listed as sensitive could be impacted by increases in runoff and sediment yield brought about by deteriorated watershed conditions resulting from increased fire frequency.

i. Wild Horses

The greatest impact to wildhorses would be the unreliable nature of cheatgrass as a forage. However, impacts to wild horses could be quite variable as discussed in "Vegetation" section e above.

j. Wilderness Study Areas

The impacts on WSAs could be quite variable. It is not likely that wilderness values would be impacted by this action even in the event that the burned area became dominated by cheatgrass.

k. Cultural Resources

Cultural resources would not likely be impacted by this alternative.

l. Livestock Industry

The impacts to the livestock industry from this alternative would be the short green period of cheatgrass, the unreliable nature of it as a forage source and the increase fire frequency. Any increase in fire activity could lead to a hardship for effected permittees, due to more frequent closure of burned areas to grazing. Halogeton is an unpalatable forage and can be poisonous to sheep. It can be very competitive and will invade a burned area particularly in the salt desert shrub plant communities.

However, impacts to the livestock industry could be quite variable as discussed in "Vegetation" section e above.

m. Visual Resources

The viewscape of a cheatgrass dominated plant community would be that of a barren landscape especially in the late summer and fall. However, the results could be quite variable as discussed in "vegetation" section e above.

n. Wetlands/Riparian

The riparian vegetation response associated with this action could be quite variable. Certain riparian areas could recover quite readily provided minimal livestock and wildlife use occurs within the area. On riparian areas that receive heavy use the chances are good the burned area could become dominated with weedy, unpalatable, fire-prone species. The riparian shrub component would likely be slow to recover in light of increased fire activity and the competitive nature of weedy plant species; particularly cheatgrass.

Soil erosion within the wetlands/riparian area could adversely impact water quality by increasing sediment loads within a drainage.

o. Floodplains

The impacts to vegetation on a floodplains would be similar to that described under the "vegetation" section.

Soil and water erosion could be quite high during the time period immediately following the fire resulting in a loss of soil productivity.

p. Forestry

The impacts to forest vegetation implementing this action would be variable. The burn cycle of a cheatgrass community could eventually eliminate the seral development of the tree species. On the other hand, the natural succession of native plants could eventually develop a climax pinyon/juniper forest if fire is excluded from the ecosystem.

q. Recreation

The impacts to recreation (particularly hunting, fishing, and photography) would occur for the reasons described under the "wildlife" and "visual resource" section.

2. Cumulative Impacts of The No Action Alternative

The no action alternative could result in 3,350 acres per year being converted to cheatgrass monoculture. The adaptive nature of this species has already resulted in it spreading rapidly in the last 20 years. The cumulative impacts of decreased species diversity and lack of suitable habitat would be similar to the crested wheatgrass only option. However, many of the cheatgrass dominated areas would not be evolving towards a more diverse plant community due to the burn cycle of cheatgrass.

D. Mitigation Measures

The following are special project stipulations and standard operating procedures listed by alternative, for the Battle Mountain District EFR program. They will be used where applicable for all EFR projects. These stipulations and operating procedures are not intended to be all inclusive, as new stipulations may be added, when the addendums are prepared to meet project specific needs.

1. Proposed Action

Natural Revegetation With Closure

a. Monitoring studies will be established to determine when grazing shall be resumed.

Planting of Multiple Species Seed Mixtures

a. Seed will be applied only in designated areas at rates and mixtures specified. Aerial broadcast of seed will only be considered in areas of 10 inches or greater precipitation.

b. Seeding will be done promptly.

c. A cultipacker-type seeder will be used to distribute seed evenly and control seeding depth if the seedbed is smooth and free of rocks.

d. A rangeland drill will be used if the site is rough and rocky. Seed will be drilled on the contour, within safety constraints. The seeding operation will circumvent very cobbly or stony areas of rock outcrop, steep slopes that are 20% or greater, gullies, woodland areas that are heavily stocked, as well as springs and seeps. Broadcast seeding (hand and/or aerial) will be used on slopes greater than 20% and where the average rainfall is greater than 12 inches. Islands of unburned vegetation will not be seeded.

e. Circumvent seeding of community pits, common use areas, sand and gravel sites, sanitary landfill areas, hazardous waste dumps and active mining areas.

f. A cultural inventory will be completed prior to ground disturbing activities. If archaeological values are present, the areas will be flagged and will not be disturbed.

g. Burn areas receiving less than eight inches of annual precipitation usually will not be considered for seeding, unless the EFR team determines that suitable drought tolerant plant material can be successfully used.

h. The USDA-Nevada Bulletin No. NV430-3-13 "Soils Guide for Rating According to Their Relative Suitability for Rangeland Seedings in Nevada" will be used to determine whether a burn area is suitable for a rangeland seeding. Appropriate USDA - SCS Soil Survey handbooks will also be used in addition to the U.S. Forest Service "User Guide to Vegetation" (1979), and U.S. Bureau of Land Management "Solid Minerals Reclamation Book" (1992) to assess the suitability of the proposed seeding.

i. A project inspector will monitor all phases of the proposed project.

j. The area to be seeded will be deferred from grazing for at least two growing seasons or until vegetation is successfully established either by fencing or closing of pastures or the entire allotment. In lieu of a signed agreement a grazing decision will be issued with notification of the closures.

k. Browse species, except four-wing saltbush, winterfat and shadscale will only be seeded in areas greater than 12 inches annual precipitation.

l. Monitoring studies will be established to determine that seeding objectives are met before grazing is resumed.

m. Crested wheatgrass will not be seeded within riparian areas.

n. Sagebrush and forb species will be included as part of the rehabilitation plan in sage grouse use areas as per the sage grouse Management Guidelines set forth by the Western States Sage Grouse Committee. In general these guidelines stress the importance of sagebrush to sage grouse populations.

o. Necessary precautions will be taken to avoid active raptor nests and to avoid disruptions to nesting and rearing activities.

p. Wilderness Study Areas that are recommended for seeding will be with native species only.

Planting of Native Shrub or Tree Seedlings

a. Monitoring studies will be established for all seedling projects.

b. Shadscale and winterfat could be used in the shadscale/budsage and Wyoming sagebrush plant communities. Bitterbrush, cliffrose, snowberry, serviceberry, mountain mahogany, and aspen seedlings could be used in the Mt. sagebrush, Pinyon-Pine/Juniper Woodlands, and aspen plant communities if practical.

Construction of Erosion and Sediment Control Structures

a. Planning, design, and construction of erosion and sediment control structures and floodwater retarding structures will be done in accordance with BALM Manual 1741.2, Water Control Structures, and the State of Nevada, Handbook of Best Management Practices.

Greenstripping

a. Stipulations and measures under "Planting of Multiple Species Seed Mixtures" will apply to this treatment. There are no set standards for establishing greenstrip widths. A number of variables such as soil productivity and rockiness, proposed greenstrip species, type and degree of livestock use, expected fire behavior, and topography all must be considered in determining greenstrip width. Most greenstrips are at least 300 feet wide, but there are variable criteria to increase or decrease that width as outlined in BALM (NSO) Instruction Memorandum No. NV-92-252.

b. Guidance on preparation and implementation of Greenstripping plans will be established following procedures in the Greenstrip Handbook and Instruction Memorandum No. NV-92-252.

Fencing

a. All steel fence posts will be green.

b. A cultural inventory will be completed along proposed new fences prior to any construction activity. Mitigation will take place if cultural values are present.

c. In most cases fence construction and reconstruction will conform to the BALM Manual Handbook H-1741-1. Fences in wildhorse areas will be designed in such a way as to be visible to horses and will have at least one gate installed per mile and/or every corner.

d. Where possible, a high tensile solar panelled electric fence will be used.

2. Crested Wheatgrass Only Alternative

All stipulations as outlined under the proposed action will apply to this alternative.

3. No Action Alternative

This alternative has no special project stipulations.

V. Persons, Groups, and Agencies Consulted

The development of this plan was largely based upon the information in the Elko and Winnemucca Districts' Normal Fire Rehabilitation Plan. The two Districts have had a plan in place for several years. Over the past 10 years, the Elko District has rehabilitated approximately 17,000 acres and the Winnemucca District has rehabilitated 63,000 acres. Editorial input during the development of the draft was a cooperative effort between staff specialists within the Tonopah and Shoshone/Eureka Resource Areas, District Resource staff specialists, Operations staff specialists, and specialists in the Winnemucca and Elko BALM Districts and Nevada State Office. An "Open for Public Solicitation" was advertised in the Battle Mountain Bugle, Elko Free Press and Central Nevada News. The mailing list included: Robert Scmidt (USDA/SCS), Dr. Jim Young (USDA/ARS), Robert McQuivey NDOW, Dr. Steve Monsen (USDA/USFS) and George Nash (APHIS). Dr. Jim Young (USDA/ARS) and George Nash (APHIS) provided comments.

VI. Evaluation and Revision

When the "Natural Revegetation with Closure" option is implemented a monitoring system using composition of key species by weight on the major ecological sites will be established to determine when the burned area has recovered sufficiently to resume grazing.

A monitoring system utilizing production will be established to determine when grazing shall be resumed when rangeland seedings have been burned.

For seeded areas, monitoring studies will be established using standard BALM techniques of weight estimate and frequency to provide percent composition. Once grazing has been resumed utilization will also be determined.

The NFRP is a continuing process; the history, treatments and predicted averages will be updated every three years. Treatments could be revised based on new technology or success or failures of existing treatments.

VII. Intensity of Public Interest

Due to the relative small amount of burned acreage in the Battle Mountain District, there has not been a great deal of interest by the general public except in the cases of the degree in which individuals are being effected by the burn and/or proximity of the burns to their property. Most of the public interest in the Battle Mountain District comes from livestock permittees and wildlife managers in regards to the loss of AUMs and big game forage and preventing unpalatable plants, particularly cheatgrass and halogeton from invading the burned area.

VIII. Participating Staff

Specialist	Review Responsibility
Tom Hilken	Lead Preparer
John Winnepenninkx	Wild Horse and Burro
Tracey Pharo	Wilderness/Visual Resources
Bobby McGonagle	Cultural Resources
Duane Crimmins	T/E Species/Wildlife
John Keenan	Reclaimation/Operations
Jeff Weeks	Range/Watershed/Air Quality/Riparian
Mike Sondergaard	Forestry
Wayne King	Shoshone/Eureka Resource Area
Ted Angle	Tonopah Resource Area
Mark Swinney	Range/Reclaimation
Mike Stewart	Reclamation/Range
Floyd Thompson	Range
Valerie Dobrich	Wild Horse and Burro
Rodney Hannon	Reclamation
Bob Sherwood	T/E Species/Wildlife
Chris Stubbs	Environmental Coordinator/District
Dave Davis	Environmental Coordinator/Shoshone/Eureka Resource Area

IX. Appendices

APPENDIX 1

A. Site Specific Addendum for the _____Fire (e.g.K-334)
   1. Fire Statistic
      a. Date
      b. Location
      c. Intensity of Fire
      d. Size (acreage PVT/BLM)
      e. Burned Area Report (Form 1742-1)
   2. Affected Environment Statistics
      a. Soils (type/acres)
      b. Water and Air Resources
      c. Vegetation (type/acres)
      d. Threatened, Endangered or Sensitive Species
      e. Land Treatment (type/acres)
      f. Wildlife Species (use area acres/population estimate)
      g. Wild Horse HMA (use area acres/population estimate)
      h. WSA (acres)
      i. Grazing (AUMs)
      j. Cultural Resources
      k. VRM Class (class/acres)
      l. Land Status
   3. Determination of Recovery Potential
      a. Use Appendix #1 Page 1 H-1742-1
      b. Ecological Status and Seral Stage
   4. Proposed Treatment Statistics
      a. Acres to be treated.
      b. Seed Mixture
      c. Method of Application
      d. Planned dates of treatment
      e. Start date of deferment
      f. Facilities needed for deferment
      g. Method of deferment
      h. AUMs to be deferred
      i. Use maps, tables and narrative as appropriate
   5. Impacts
      a. Address the impacts of actions in #4 on values in #2 above.
   6. Consultation
      a. Document all interested parties who were consulted in the addendum and their position on the proposal.
   7. Monitoring
      a. List the type/location/frequency and method of monitoring (see H-1742-1 Page 9, item XV & XVI).

B. Management Decision Documentation/Environmental Conclusions

Prepared by_____
Approved by Area Manager_____
Approved by District Manager_____

The fire rehabilitation team evaluation would be included as part of the addendum.

Emergency Fire Rehabilitation Team
(Roles and Responsibilities)

The following roles and responsibilities are assigned to the Emergency Fire Rehabilitation Team members.

1. Determine plant mortality by using a Tetrazolium test or ocular inspection of perennial plant crowns.

2. Determine intensity of fire by ocular inspection of plants and consulting with the Fire Control Officer and/or Fire Behavior Analyst.

3. Determine if seeding is appropriate by using the following:

   a. Appropriate Soil Survey Guide and Map.

   b. Technical Bulletin NV430-3-13 "Soils Guide for Rating According to the Relative Suitability for Rangeland Seedings in Nevada."

   c. Consider steepness of slope, suitable terrain, and precipitation regime.

4. Establish vegetative objectives for the potential rehabilitation project.

5. Determine fence requirements (electric, permanent, and location) and recommend a livestock agreement and/or decision to keep livestock off the rehabilitation area.

6. Note other impacts caused by the fire (i.e. buildings, riparian areas, channel stability, erosion potential and cultural concerns).

7. Determine appropriate monitoring method to evaluate vegetative objectives.

8. Submit recommendations and evaluation to appropriate Area Manager.

SEED COSTS, CHARACTERISTICS AND QUALITY STANDARDS

Common Name	Bulk Cost/lb[1]	Seeds/lb. 1000's[2]	Seeds/Ft.[2] at 1 lb./ac	Minimum Purity[2]	Minimum Germination	Min PLS[3]
Annual ryegrass	$0.35	217	5.0	95	90	0.86
Beardless wheatgrass	$3.50	135	3.0	90	85	0.77
Bluebunch wheatgrass	$2.50	140	3.2	90	85	0.77
Bottlebrush squirreltail	$4.50	192	4.4	25	80	0.20
Ephraim crested wheatgrass	$2.50	200	4.6	95	85	0.81
Fairway crested wheatgrass	$0.60	200	4.6	95	85	0.81
Great basin wildrye	$10.00	165	3.8	80	85	0.68
Hard fescue	$3.50	565	13	95	85	0.81
Indian ricegrass	$7.00	235	5.4	95	80	0.76
Intermediate wheatgrass	$0.75	100	2.4	95	85	0.81
Paiute orchard grass	$1.50	540	12	90	80	0.72
Pubescent wheatgrass	$1.10	91	2.0	90	85	0.77
Russian wildrye	$2.80	170	3.9	90	80	0.72
Sand dropseed	$7.00	5298	121	90	80	0.72
Sheep fescue	$4.50	680	15.6	98	85	0.83
Siberian crested wheatgrass	$0.60	250	5.7	95	86	0.81
Standard crested wheatgrass	$0.60	175	4.0	95	95	0.90
Streambank wheatgrass	$2.50	170	3.9	90	80	0.72
Tall wheatgrass	$2.00	79	1.8	95	85	0.81
Thickspike wheatgrass	$2.50	154	3.5	90	80	0.72
Western wheatgrass	$2.90	110	2.5	85	60	0.51
Alfalfa	$1.80	225	5.2	99	85	0.84

Common Name	Bulk Cost/lb[1]	Seeds/lb. 1000's[2]	Seeds/Ft.2 at 1 lb./ac	Minimum Purity[2]	Minimum Germination	Minimum PLS[3]
Small burnet	$1.65	55	1.3	98	85	0.83
Sainfoin	$1.25	18	0.4	90	75	0.68
Yellow sweet Clover	$0.50	260	6.0	99	85	0.84
Antelope bitterbrush	$5.00	15	0.4	90	85	0.77
Basin big sagebrush		$4.80	2500	57.3	16	0.80
Fourwing saltbush	$4.25	70	1.6	90	50	0.45
Mountain big sagebrush	$4.00	2500	57.3	16	80	0.13
Prostrate kochia	$12.00	500	11.6	70	40	0.28
Serviceberry	$21.00	45	1.0	95	75	0.71
Winterfat	$9.00	55	1.3	50	75	0.36
Wyoming big sagebrush		2500	57.3	16	80	0.13

Antelope bitterbrush seedlings $500.00 to 750.00/1000 plants

[1] Cost based on 1990 prices with adjustments made on predicted market trend.
[2] Compiled from the updated ELKO NFYRP
[3] PLS = Pure live seed; the product of minimum purity x minimum germination

Estimated Costs of Equipment and Personnel

Rangeland drill with track vehicle	$15.00/ac.
Rangeland drill with rubber tire vehicle	$ 5.00/ac
Aerial application with helicopter	$11.00/ac.
Aerial application with fixed wing	$11.00/ac
Hand application with prison crew	$200.00/day for 10 men crew
Cultural Inventory	$ 2.00 to $10.00/acre
Project survey and design	$2.00 - 6.00/acre
Contracts	12% of total cost
Force Accounts	10% of total cost
Temporary electric fence	$2500.00/mi.
3 Strand barbed wire fence	$4200.00/mi.
14 foot cattleguard	$3700.00 ea.
Jarbidge Sagebrush Seeder	$6.00/ac.
Amazon Drill	$10.00/ac.

Cultural Resources
Fire Rehabilitation Plan

The following procedures are followed in establishing strategy for cultural resource inventory of proposed fire rehabilitation projects.

1. Nevada BALM Cultural Inventory guidelines will be used.

2. Proposed rehabilitation areas will be surveyed for cultural resources at no more than 30 meter transect intervals and that class II surveys will be negotiated on a case by case basis as appropriate.

3. Fencelines are proposed to be surveyed in one linear transect along the proposed route.

4. Avoidance of cultural resources is the preferred action. This would result in "no effect" which affords a shorter time frame for Section 106 review period.

Plant Species Rehabilitation List

GRASSES

Alkali Sacton - Sporobolus airoides
- Native, warm season, bunchgrass
- Soil Texture - All, best on salt/sodic valley bottoms
- Ease of establishment - fair
- Drought tolerance - good
- Precipitation zone - 8 to 10 inches

Annual ryegrass - Lolium multiflorum
- Introduced annual grass
- Soil texture - all
- Ease of establishment - good
- Drought tolerance - poor
- Precipitation zone - greater than 18 inches for establishment - useful to provide quick cover for lower precipitation zones

Beardless wheatgrass - (Agropyron inerme)
- Whitmar Variety
- Native perennial, cool season bunchgrass, best adapted in northern and eastern Nevada
- Soil texture - All, best on medium to clayey
- Ease of establishment - Excellent
- Drought tolerance - Excellent
- Precipitation Zone - 8 to 10 inches

Bluebunch wheatgrass - Agropyron spicatum
- Secar Variety
- Native perennial cool season, bunchgrass
- Soil texture - Medium to clayey
- Ease of establishment - Fair
- Drought tolerance - Good
- Precipitation Zone - 10 to 20 inches

Bottlebrush squirreltail - Sitanion hystrix
- Native perennial, cool season, bunchgrass
- Soil texture - all
- Ease of establishment - poor, seed difficult to plant
- Drought tolerance - good
- Precipitation zone - 6 to 8 inches

Ephraim crested wheatgrass - Agropyron cristatum
- Introduced perennial, cool season, sod former
- Soil Texture - All, best on medium to clayey
- Ease of establishment - Excellent
- Drought tolerance - Good
- Precipitation zone - 8 to 14 inches; best if greater than 10 inches

Fairway crested wheatgrass - Agropyron cristatum
- Introduced perennial, cool season, bunchgrass
- Soil texture - All; best on medium to clayey
- Ease of establishment - Excellent
- Drought tolerance - Good
- Precipitation zone - 8 to 14 inches

Great basin wildrye - Elymus cinereus
Magnar Variety
Native perennial, cool season, bunchgrass
Soil texture - Medium to clayey; not suited to sandy soils
Ease of establishment - Fair
Drought tolerance - Fair
Precipitation Zone - 10 to 12 inches

Hard fescue - Festuca longifolia
Durar variety
Introduced, cool season, bunchgrass
Soil texture - all; best on silty or clay soils
Ease of establishment - fair
Drought tolerance - fair; less drought tolerant than Sheep Fescue
Precipitation zone - 14 to 30 inches

Indian ricegrass - Oryzopsis hymenoides
P-2575 Variety
Native perennial, cool season, bunchgrass
Soil texture - best on sandy or silty soils
Ease of establishment - Difficult
Drought tolerance - Very good
Precipitation zone - 6 to 10 inches

Intermediate wheatgrass - Agropyron intermedium
Greenar Variety
Introduced perennial, cool season, sod former
Soil texture - All but sandy soils
Ease of establishment - Excellent
Drought tolerance - Fair
Precipitation zone - 11 to 14 inches

Paiute orchardgrass - Dactylis glomerata
Latar or Pomar Variety
Introduce perennial, cool season, bunchgrass
Soil texture - All
Ease of establishment - Good
Drought tolerance - Good
Precipitation zone - 11 + inches

Pubescent wheatgrass - Agropyron intermedium trichophorum
Topar or Lunar Varieties
Introduced perennial, cool season, sod former
Soil texture - All
Ease of establishment - Excellent
Drought tolerance - Fair to good
Precipitation zone - 11 to 14 inches

Russian wildrye - Elymus junceus
Bozoisky or Vinall Variety
Introduced perennial, cool season, bunchgrass
Soil texture - All, best on loams
Ease of Establishment - Fair
Drought tolerance - Good
Precipitation zone - 10 to 14 inches

Sand dropseed - Sporobolus cryptandrus
Native, warm season, bunchgrass
Soil texture - all; does best on sandy and gravelly soils
Ease of establishment - good on sandy soils
Drought tolerance - good
Precipitation zone - 8 to 10 inches

Sheep fescue, Festuca ovina
Covar variety
Introduced perennial
Soil Texture - all
Ease of establishment - fair, frequently slow
Drought tolerance - Good
Precipitation Zone - 12 + inches

Siberian wheatgrass - Agropyron sibiricum
P-27 Variety
Introduced perennial, cool season, bunchgrass
Soil texture - All, best on medium to clayey
Ease of establishment - Excellent
Drought tolerance - Excellent, more drought tolerant
then Agropyron desertorum
Precipitation zone - 8 to 10 inches

Standard crested wheatgrass - Agropyron desertorum
Nordan or hycrest Variety
Introduced perennial, cool season, bunchgrass
Soil texture - All; best on medium to clayey
Ease of establishment - Excellent
Drought tolerance - Good
Precipitation zone - 8 to 14 inches

Streambank wheatgrass - Agropyron dasystachyum riparium
Sodar Variety
Native perennial, cool season, sod former, good for erosion control
Soil texture - Moderately coarse to medium
Ease of establishment - Fair
Drought tolerance - high
Precipitation zone - 8 to 10 inches

Tall wheatgrass - Agropyron elongatum
Alkar or Largo Varieties
Introduced perennial, cool season, bunchgrass
Soil texture - Medium to moderately fine
Ease of establishment - Fair
Drought tolerance - Fair
Precipitation zone - 12 to 14 inches

Thickspike wheatgrass - Agropyron dasystachyum
Critana variety
Native, cool season, strongly rhizomatous
Soil texture - does best on sandy and gravelly soils
Ease of establishment - easily estab., excellent seedling vigor
Drought tolerance - Fair
Precipitation zone - 8 to 10 inches

Thurber's needlegras - Stipa thurberiana
Native perennial, cool season, bunchgrass
Soil texture - medium to clayey
Ease of establishment - Fair
Drought tolerance - Good
Precipitation zone - 10 to 20 inches

Western wheatgrass - Agropyron smithii
Native perennial, cool season, sod former
Soil texture - medium to clayey
Ease of Establishment - Fair
Drought tolerance - Good
Precipitation zone - 10 to 14 inches

FORBS

Arrowleaf Balsamroot - Balsamorhiza spp.
Native perennial, cool season
Soil texture - medium, well drained
Ease of establishment - Fair
Drought tolerance - Fair
Precipitation zone - 10 to 14 inches

Alfalfa - Medicago sativa
Nomad or Ladak Varieties
Ladak is the Preferred Variety for Mixtures
Introduced perennial, Nitrogen-fixer
Soil texture - All
Ease of establishment - Excellent
Drought tolerance - Fair
Precipitation zone - 10 to 18 inches

Desert globemallow - Sphaeralcea ambigua
Native perennial, cool season
Soil texture - medium, well drained
Ease of establishment - Fair
Drought tolerance - Fair
Precipitation zone - 8 to 14 inches

Lewis flax - Linum lewisii
Appar variety
Native perennial, cool season
Soil texture - medium, well drained
Ease of establishment - Good
Drought Tolerance - Fair
Precipitation zone - 10 inches and above

Sainfoin - Onobrychis viciaefolia
Onar Variety
Introduced perennial, nitrogen fixed
Soil texture - moderately coarse to moderately fine
Ease of establishment - Fair
Drought tolerance - Fair
Precipitation zone - 12 to 14 inches, needs at least
10 inches for establishment

Silky Lupine - Lupinus sericeus
Native perennial, Nitrogen fixer
Soil Texture - All
Ease of establishment - Fair
Drought tolerance - Good
Precipitation zone - 10 inches and above

Small burnet - Sanquisorba minor
Introduced perennial, Nitrogen fixer
Soil texture - All
Ease of establishment - Excellent
Drought tolerance - Fair
Precipitation zone - 10 to 18 inches

Yellow sweetclover - Melilotus officinalis
Madrid or Goldtop Varieties
Introduced perennial, Nitrogen-fixer
Soil texture - All
Ease of establishment - Excellent
Drought tolerance - Good
Precipitation zone - 8 to 12 inch, best if greater than 10 inch precipitation

Western Yarrow - Achillea millefolium
Native perennial
Soil texture - All
Ease of establishment - Excellent
Drought tolerance - Good
Precipitation zone - 10 inch and above

Wild Buckwheat - Eriogonum spp.
Native perennial
Soil texture - medium, well drained
Ease of establishment - Fair
Drought tolerance - Fair
Precipitation zone - 10 to 12 inch

SHRUBS

Antelope bitterbrush - Purshia tridentata
Native shrub
Soil texture - All
Ease of establishment - Fair
Drought tolerance - Good
Precipitation zone - greater than 12 inches

Shadscale - Atriplex confertifolia
Native shrub
Soil texture - All, good on loamy to clayey soils, also saline tolerant
Ease of establishment - Fair
Drought tolerance - Good
Precipitation zone - 6-8 inches

Basin big sagebrush - Artemesia tridentata tridentata
Native shrub
Soil texture - loamy to clayey
Ease of establishment - Good with firm seedbed
Drought tolerance - Good
Precipitation zone - 10 to 12 inches

Fourwing salt bush - Atriplex canescens
Ricon variety
Native shrub
Soil texture - All, good on loamy to clayey soils, also saline tolerant
Ease of establishment - Good
Drought tolerance - Good
Precipitation zone - 8 to 12 inches

Mountain big sagebrush - Artemisia tridentata vaseyana
Native shrub
Soil texture - medium to clayey
Ease of establishment - Good with firm seedbed
Drought tolerance - Good
Precipitation zone - 12+ inches

Prostrate kochia - Kochia prostrata
Introduced shrub
Soil texture - moderately coarse to clayey (best on heavier soils) - well adapted to basic soils
Ease of establishment - Fair
Drought tolerance - Good
Precipitation zone - 5 to 27 inches

Rubber rabbitbrush - Chrysothamnus nauseosus hololeucus
Native shrub
Soil texture - Medium, well drained soils
Ease of establishment - Good on loose seedbed
Drought tolerance - Good
Precipitation zone - 8 to 10 inches

Serviceberry - Amelanchier alnifolia
Native shrub
Soil texture - medium to clayey
Ease of establishment - Fair
Drought tolerance - Fair
Precipitation zone - greater than 15 inches

Whitestem rubber rabbitbrush - Chrysothamnus nauseosus albicaulis
Native shrub
Soil texture - Medium, well drained soils
Ease of establishment - Good on loose seedbed
Drought tolerance - Good
Precipitation zone - 10 inches and above

Winterfat - Ceratoides lanata
Native shrub
Soil texture - All
Ease of establishment - Fair
Drought tolerance - Good
Precipitation zone - 6 to 8 inches

Wyoming big sagebrush - Artemisia tridentata wyomingensis
Native shrub
Soil texture - medium to clayey, grows on relatively shallow soils in the hotter, drier portion of the sagebrush region.
Ease of establishment - Good with firm seedbed
Drought tolerance - Good
Precipitation zone - 8 to 10 inches

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